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Natural
Resources
Conservation
Service

In cooperation with
Missouri Department of
Natural Resources,
Missouri Agricultural
Experiment Station, and
Missouri Department of
Conservation

Soil Survey of Dade County, Missouri



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How to Use This Soil Survey

General Soil Map

The general soil map, which is a color map, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

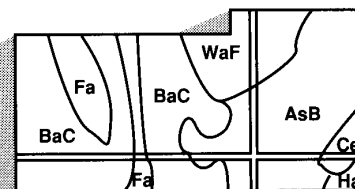
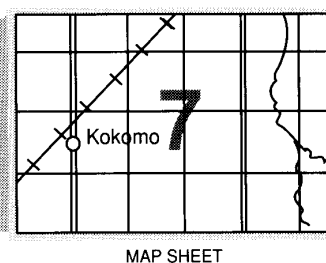
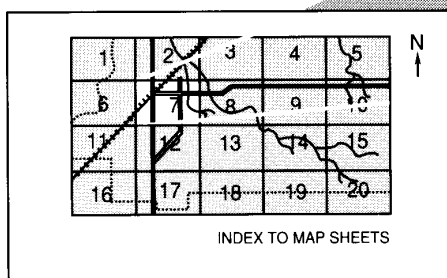
Detailed Soil Maps

The detailed soil maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**. Note the number of the map sheet and turn to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.



NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1995. Soil names and descriptions were approved in 1996. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1995. This survey was made cooperatively by the Natural Resources Conservation Service, the Missouri Agricultural Experiment Station, and the Missouri Department of Conservation. The Missouri Department of Natural Resources provided soil scientists to assist with the fieldwork. The survey is part of the technical assistance furnished to the Dade County Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

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Cover: Typical landscape in an area of the Cliquot-Bolivar association.

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service home page on the World Wide Web. The address is <http://www.nrcs.usda.gov> (click on "Technical Resources").

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Foreword

This soil survey contains information that affects land use planning in this survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

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Soil Survey of Dade County, Missouri

By Max W. Aldrich, Natural Resources Conservation Service

Fieldwork by Max W. Aldrich, Richard E. McBee, and Mike Burney, Natural Resources Conservation Service; and Chuck Harwood, R. D. Chorce, Richard L. Henderson, and John E. Bowers, Missouri Department of Natural Resources

United States Department of Agriculture, Natural Resources Conservation Service,
in cooperation with
Missouri Department of Natural Resources, Missouri Agricultural Experiment Station,
and Missouri Department of Conservation

DADE COUNTY is in the southwestern part of Missouri (fig. 1). The east part of the county is in the Ozark Border area, and the west part of the county is in the Cherokee Prairie area. Dade County is bordered on the south by Lawrence County, on the west by Jasper and Barton Counties, on the east by Greene and Polk Counties, and on the north by Cedar County. The county has an area of 323,942 acres, or about 490 square miles, including 10,003 acres of water in areas over 40 acres in size. Greenfield, the county seat, is in the central part of the county and has a population of 1,379 according to the 1990 census. The population of the county is 7,500 (Missouri Department of Agriculture, 1991).

General Nature of the County

This section describes climate, history and development, and relief and drainage in Dade County.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Lockwood in the period 1961 to 1990. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 35 degrees F and the average daily minimum temperature is 25 degrees. The lowest temperature on record, which occurred on January 18, 1930, is -22 degrees. In



Figure 1.—Location of Dade County in Missouri.

summer, the average temperature is 77 degrees and the average daily maximum temperature is 89 degrees. The highest recorded temperature, which occurred on July 14, 1954, is 116 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base

temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 44 inches. Of this, 30 inches, or 69 percent, usually falls in April through October. The growing season for most crops falls within this period. The heaviest 1-day rainfall during the period of record was 9 inches on September 21, 1925. Thunderstorms occur on about 52 days each year, and most occur between May and August.

The average seasonal snowfall is about 17 inches. The greatest snow depth at any one time during the period of record was 17 inches. On the average, 18 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 83 percent. The sun shines 66 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the south. Average windspeed is highest, between 11 and 12 miles per hour, from November to April.

History and Development

R. D. Chorce, soil scientist, Missouri Department of Natural Resources, prepared this section.

Around the beginning of the nineteenth century in the area of what is now Dade County, the original population consisted of Native Americans of primarily the Osage, Sac, and Delaware tribes. The area was settled by southern pioneers in the territory ceded by Osage tribes in 1808.

Dade County was created January 29, 1841, formed from Greene County, and was named for Major General Francis L. Dade (Historical Society of Polk County, 1977).

The settlers who arrived in late 1833 and early 1834 found evidence of previous occupation by earlier settlers. Seven miles northwest of Greenfield were the remains of a fortification and furnaces; it is believed that these were constructed by Spanish explorers (Evans and English, 1975; Goodspeed Publishing Company, 1889; Historical Society of Polk County, 1977).

Southern pioneers readily settled the area and early communities were established. Dadeville, formerly Crisp Prairie, although burned and renamed after the Civil War, was laid out around 1818; Arcola around 1880. Greenfield, Everton, and Lockwood were laid out

along the railroad in 1881. In the 1880's a number of Germans settled in and around Lockwood. In the mid-1960's, Stockton Dam impounded the waters of the Sac River in Dade and Cedar Counties.

Prior to the Civil War, oats, wheat, corn, and fruit farming were the chief crops. The raising of livestock, including beef cattle, horses, milk cows, poultry, and sheep were major contributors to earning a living. The nearest markets were to be found in Springfield, which served as the major provider for the frontier towns of southwest Missouri, northern Arkansas, eastern Kansas, and Oklahoma (Evans and English, 1975).

Typical of national economy in the postwar years, the economy of the county began to expand as new settlers moved in. The economic base grew as the railroad came through the county and, subsequently, encouraged the development of mining. Coal, zinc, iron, and, more extensively, lead was mined in the northwestern part of the county. In 1874, a 50,000-pound lead boulder brought the opening of the Corry mine and founded the one-time boomtown of Corry. Other mines were worked before mining stopped in the early 1900's.

Throughout this era, the typical farms remained very diversified. Income was derived from the sale of cream, beef, hogs, mules, sheep, eggs, fruit, timber and firewood, and other products. In addition, farmers produced a significant amount of grain, although mainly for their own livestock. In the 1930's, after the farmers started to sell whole milk instead of only cream, dairying became a significant enterprise (Evans and English, 1975). Dairy cattle numbers reached a peak in the period from 1940 to 1950. In 1990, the county ranked thirtieth in the number of dairy cattle in the state.

Beef cattle production has remained very significant throughout the recorded history of the county. It is dependent upon the amount of quality forage produced. After 1940, the number of beef cattle began to relatively increase (Evans and English, 1975). In 1990, the county ranked twelfth in the state in the number of beef cattle (Missouri Crop and Livestock Reporting Service, 1990).

Around the turn of the century, corn, oats, and wheat were the dominant row crops. After the 1940's, the trend shifted from corn production to including soybeans and sorghum in the crop rotation. Fertilizer usage has increased fivefold since 1950. In hay production, from 1900 to 1990, the yield in tons per acre has more than doubled, and tons produced have increased seven times (Missouri Crop and Livestock Reporting Service, 1990). After 1940, orchardgrass, small grain cut for hay, red clover, and sorghum were

important forage crops. Lespedeza production started in the 1930's and was very important through the 1950's. Alfalfa was gaining popularity by 1950 and was productive until the early 1970's when production was reduced due to the influx of the alfalfa weevil. During the past three decades, tall fescue has dominated the area. In recent years, alfalfa, red clover, ladino clover, and orchardgrass have all played important roles in hay and pasture production. Since the 1980's, warm-season grasses have become very popular for the "summer slump" on the predominate cool-season grasses. Specialty crops in the county include popcorn, cucumbers, sunflowers, and fruit production.

During the period from 1900 to 1987, the total number of farms decreased from 2,732 to 915. The average size of the farms increased from 108 to 289 acres (Missouri Crop and Livestock Reporting Service, 1990).

Relief and Drainage

Dade County is a transition area between the gently rolling to hilly landscapes of the Ozark Border region and the nearly level to gently rolling plain of the Cherokee Prairie region.

A broad, smooth upland divide separates these transitional regions in Dade County. This divide extends from the Cedar County line, north of the town of Arcola, south through the town of Lockwood, into Lawrence County. West of this divide consists of broad flat areas and scattered low mounds, usually of a Pennsylvania age geology. Local relief is generally 50 to 100 feet. In the slightly more dissected areas surrounding the towns of Sylvania and Cedarville, in the northwest corner of the county, local relief may be more than 150 feet. The areas east of this divide, except for the remnant prairies surrounding the towns of Dadeville and Greenfield, are the most dissected. Local relief generally is 100 to 250 feet; however, in areas along major streams, it is more than 300 feet.

The highest elevation in Dade County, at 1,260 feet, is near the Lawrence County line south of the town of Lockwood. The lowest point, at 867 feet, is the normal pool elevation of Stockton Lake, which is in the northeast part of the county.

The Sac River and Turnback Creek drain most of the deeply dissected areas in the eastern half of the county. Sons Creek traverses across the gently rolling landscapes of the central area. These three major drainage systems form the headwaters of Stockton Lake.

Cedar Creek, Horse Creek, and the North Fork (Muddy Creek) of the Spring River drain most of the nearly level to gently sloping areas in the western part

of the county. The North Fork of the Spring River is the only major drainage system in the county not part of the Osage River watershed. This system drains the southwest corner of the county and is part of the Spring River watershed.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept or model of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are

concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet

local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Table 1.--Temperature and Precipitation
(Recorded in the period 1961-90 at Lockwood, Missouri)

Month	Temperature						Precipitation					
				2 years in 10 will have--		Average	2 years in 10 will have--			Average		
	Average	Average	Average			number of	Average			number of	Average	
	daily	daily	daily	Maximum	Minimum	growing		Less	More	days with	snow-	
	maximum	minimum		temperature	temperature	degree		than--	than--	0.10 inch	fall	
			higher than--	lower than--		days*				or more		
	°F	°F	°F	°F	°F	Units	In	In	In		In	
January-----	42.7	21.6	32.2	70	-8	8	1.58	0.55	2.52	3	4.2	
February----	48.0	26.1	37.0	75	-3	21	2.18	0.93	3.24	3	4.4	
March-----	59.3	35.9	47.6	83	10	104	3.78	1.97	5.37	6	3.8	
April-----	70.1	45.5	57.8	88	25	266	4.10	2.00	5.91	6	0.0	
May-----	77.6	54.6	66.1	90	34	498	4.95	2.89	6.80	7	0.0	
June-----	85.4	63.1	74.3	96	46	728	5.11	3.23	6.82	6	0.0	
July-----	90.9	67.9	79.4	102	52	912	3.55	1.27	5.44	4	0.0	
August-----	90.0	65.8	77.9	102	50	865	4.19	1.58	6.37	5	0.0	
September---	81.8	58.7	70.3	97	37	608	4.59	2.23	6.64	6	0.0	
October-----	71.7	47.5	59.6	90	27	318	3.94	1.37	6.07	5	0.0	
November----	57.6	36.5	47.1	80	12	90	3.73	1.53	5.83	5	0.9	
December----	46.0	26.0	36.0	71	-3	16	2.63	1.31	3.78	4	3.4	
Yearly: Average	68.4	45.8	57.1	---	---	---	---	---	---	---	---	
Extreme	108	-17	---	103	-10	---	---	---	---	---	---	
Total-----	---	---	---	---	---	4,435	44.34	35.01	52.42	60	16.8	

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

Table 2.--Freeze Dates in Spring and Fall
(Recorded in the period 1961-90 at Lockwood, Missouri)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 4	April 14	April 26
2 years in 10 later than--	March 29	April 9	April 22
5 years in 10 later than--	March 18	March 31	April 13
First freezing temperature in fall			
1 year in 10 earlier than--	October 31	October 19	October 8
2 years in 10 earlier than--	November 5	October 24	October 12
5 years in 10 earlier than--	November 13	November 3	October 20

Table 3.--Growing Season
(Recorded in the period 1961-90 at Lockwood,
Missouri)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	<u>Days</u>	<u>Days</u>	<u>Days</u>
9 years in 10	221	193	174
8 years in 10	227	201	179
5 years in 10	239	215	189
2 years in 10	250	230	199
1 year in 10	256	237	204

General Soil Map Units

The general soil map in this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The components of one map unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for

selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil Descriptions

1. Bona-Creldon-Hoberg Association

Setting

Landform: Ridge and divide (fig. 2)

Slope range: 1 to 8 percent

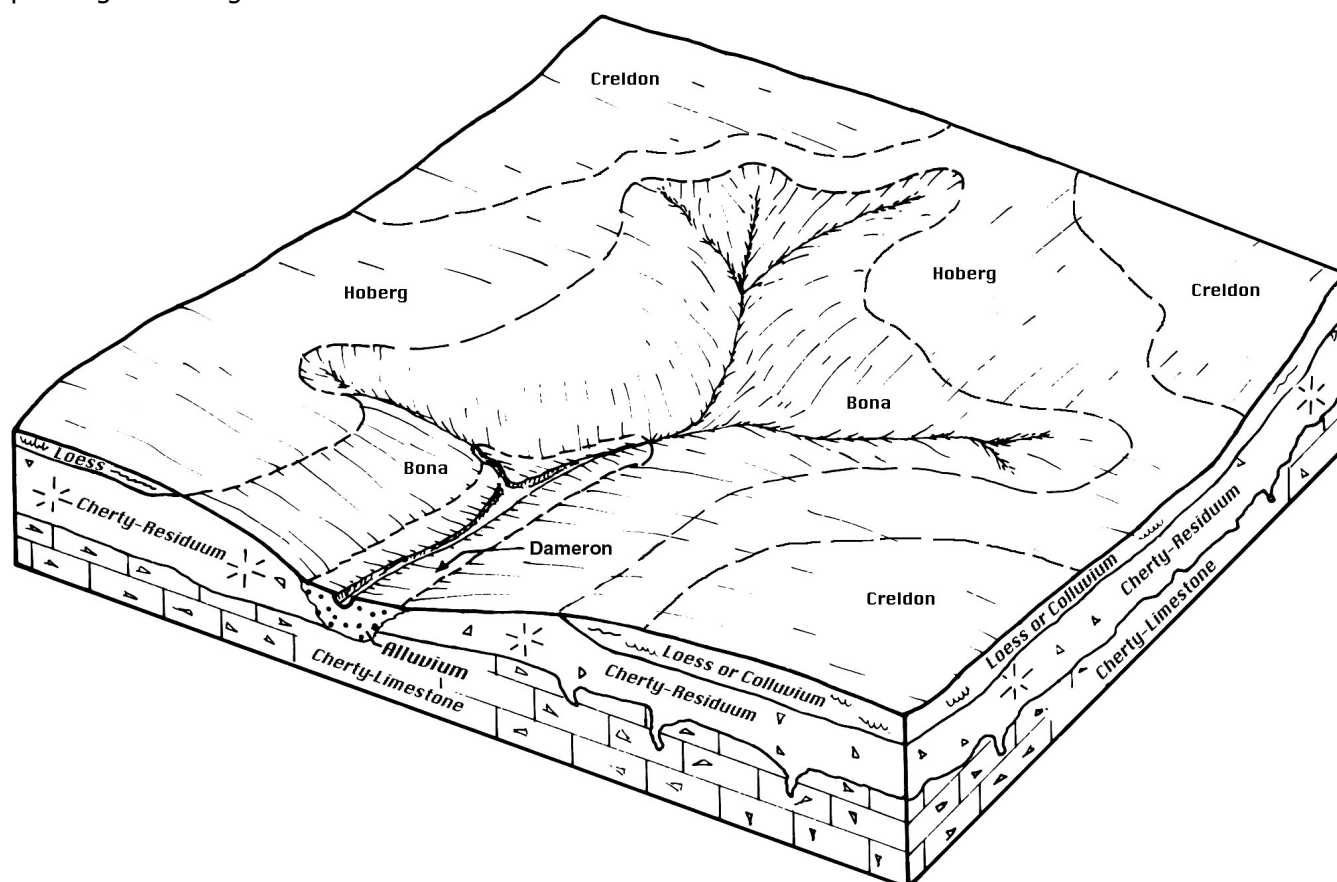


Figure 2.—Typical pattern of soils and parent material in the Bona-Creldon-Hoberg association.

Composition

Extent of the association:

10 percent of the survey area

Extent of the soils in the association:

Bona and similar soils—35 percent

Creldon and similar soils—30 percent

Hoberg and similar soils—25 percent

Minor soils

- Barden soils on footslopes
- Wanda soils on footslopes

Creldon

Position on landform: Summit

Parent material: Loess over gravelly colluvium over clayey residuum weathered from cherty limestone

Slope: 1 to 3 percent

Hoberg

Position on landform: Summit

Parent material: Fine-loamy colluvium over clayey residuum weathered from cherty limestone

Slope: 2 to 5 percent

Landscape

Bona

Position on landform: Shoulder

Parent material: Gravelly colluvium over clayey residuum weathered from cherty limestone

Slope: 3 to 8 percent

2. Goss-Sonsac-Pomme Association

Setting

Landform: Hill and strath terrace (fig. 3)

Slope range: 3 to 35 percent

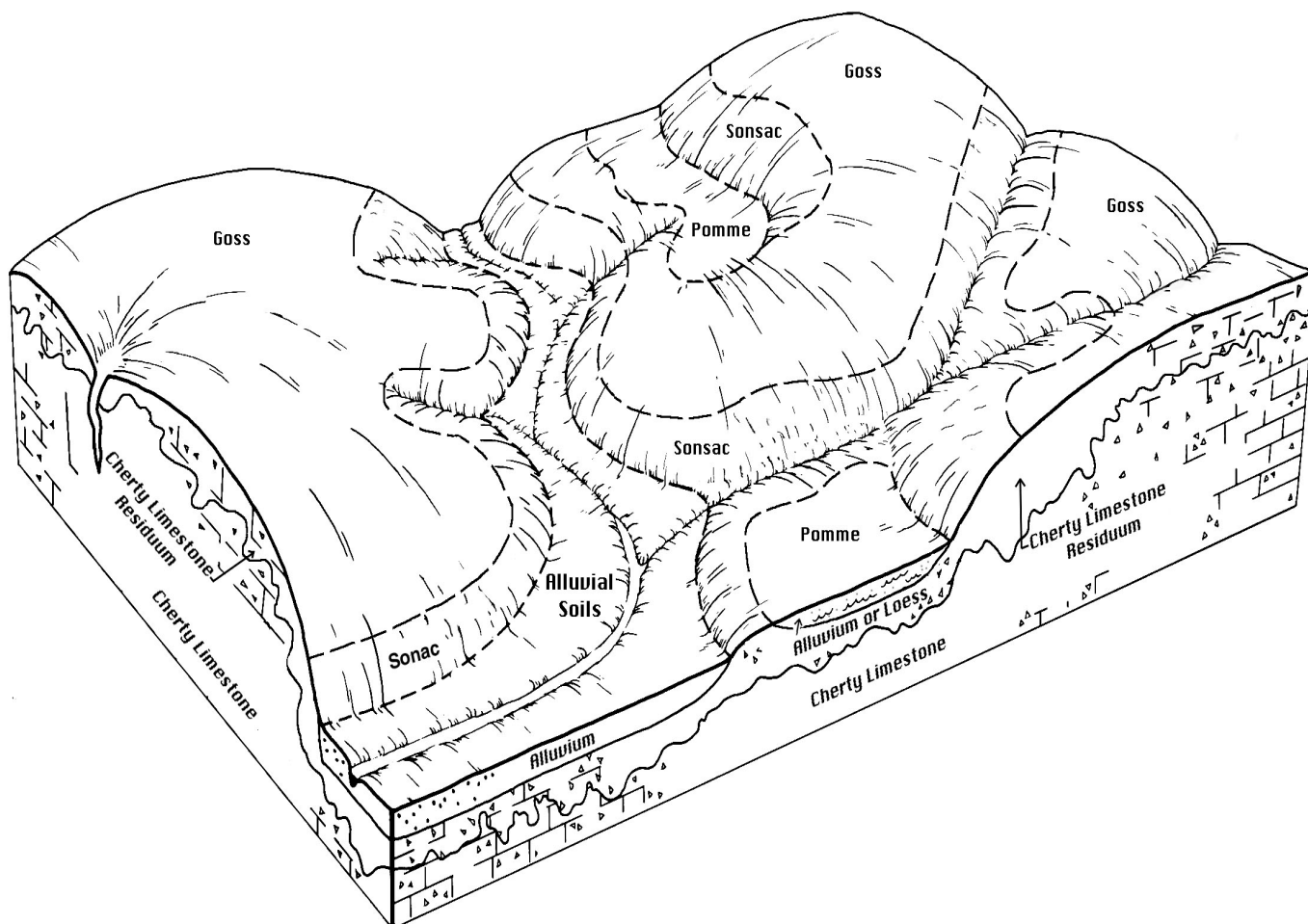


Figure 3.—Typical pattern of soils and parent material in the Goss-Sonsac-Pomme association.

Composition

Extent of the association:

40 percent of the survey area

Extent of the soils in the association:

Goss and similar soils—60 percent

Sonsac and similar soils—15 percent

Pomme and similar soils—10 percent

Minor soils

- Wilderness soils on shoulder slopes
- Viraton soils on summits
- Moko soils on backslopes
- Hartville soils on footslopes
- Woodson soils on toeslopes
- Alsup soils on backslopes

Landscape

Goss

Position on landform: Shoulder and backslope

Parent material: Gravelly colluvium over clayey residuum weathered from cherty limestone

Slope: 3 to 35 percent

Sonsac

Position on landform: Backslope

Parent material: Gravelly colluvium over clayey residuum

Slope: 3 to 35 percent

Pomme

Position on landform: Summit

Parent material: Loess over gravelly colluvium over clayey residuum weathered from cherty limestone

Slope: 1 to 8 percent

3. Creldon-Hoberg-Barden Association

Setting

Landform: Divide and ridge

Slope range: 1 to 5 percent

Composition

Extent of the association:

6 percent of the survey area

Extent of the soils in the association:

Creldon and similar soils—65 percent

Hoberg and similar soils—20 percent

Barden and similar soils—10 percent

Minor soils

- Bona soils on shoulders
- Wanda soils on footslopes
- Parsons soils on broad summits

Landscape

Creldon

Position on landform: Summit

Parent material: Loess over gravelly colluvium over clayey residuum weathered from cherty limestone

Slope: 1 to 3 percent

Hoberg

Position on landform: Summit

Parent material: Fine-loamy colluvium over clayey residuum weathered from cherty limestone

Slope: 2 to 5 percent

Barden

Position on landform: Summit

Parent material: Loess over residuum weathered from clayey shale

Slope: 1 to 3 percent

4. Barden-Parsons Association

Setting

Landform: Divide

Slope range: 0 to 3 percent

Composition

Extent of the association:

13 percent of the survey area

Extent of the soils in the association:

Barden and similar soils—68 percent

Parsons and similar soils—25 percent

Minor soils

- Barco and Sylvania soils on summits
- Bona soils on shoulders
- Cherokee soils on toeslopes

Landscape

Barden

Position on landform: Summit

Parent material: Loess over residuum weathered from clayey shale

Slope: 1 to 3 percent

Parsons

Position on landform: Summit

Parent material: Silty and clayey colluvium

Slope: 0 to 2 percent

5. Sylvania-Barden-Barco Association

Setting

Landform: Hill, divide, and ridge (fig. 4)

Slope range: 2 to 15 percent

Composition

Extent of the association:

9 percent of the survey area

Extent of the soils in the association:

Sylvania and similar soils—38 percent

Barden and similar soils—36 percent

Barco and similar soils—19 percent

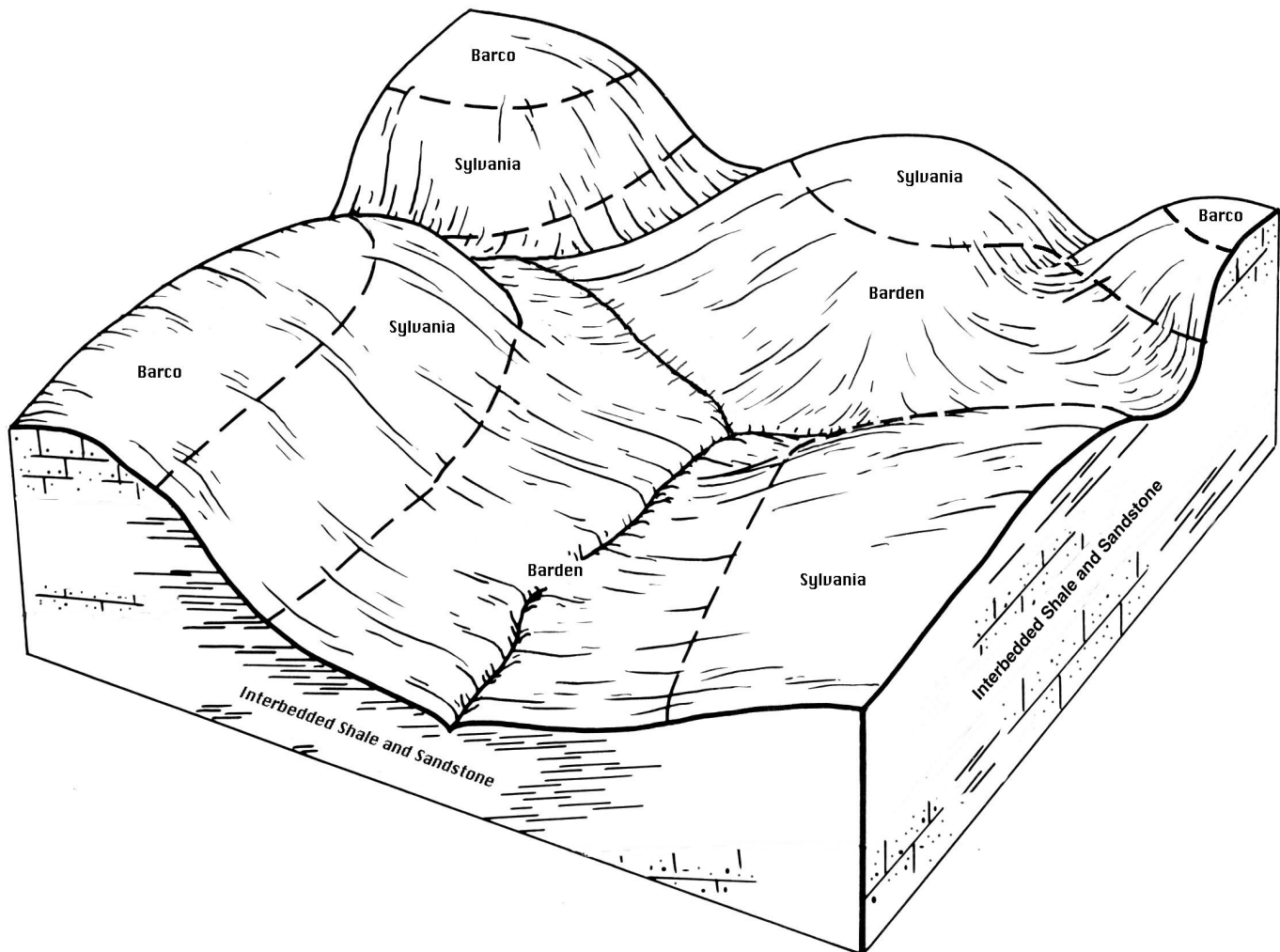


Figure 4.—Typical pattern of soils and parent material in the Sylvania-Barden-Barco association.

Minor soils

- Parsons soils on summits
- Bona soils on shoulders
- Woodson soils on toeslopes

Landscape**Sylvania**

Position on landform: Summit and backslope

Parent material: Colluvium over clayey residuum weathered from shale and sandstone

Slope: 2 to 15 percent

Barden

Position on landform: Summit and footslope

Parent material: Loess over residuum weathered from clayey shale

Slope: 1 to 5 percent

Barco

Position on landform: Summit

Parent material: Residuum weathered from sandstone

Slope: 2 to 5 percent

6. Cliquot-Bolivar Association***Setting***

Landform: Ridge and hill (fig. 5)

Slope range: 3 to 15 percent

Composition

Extent of the association:

13 percent of the survey area

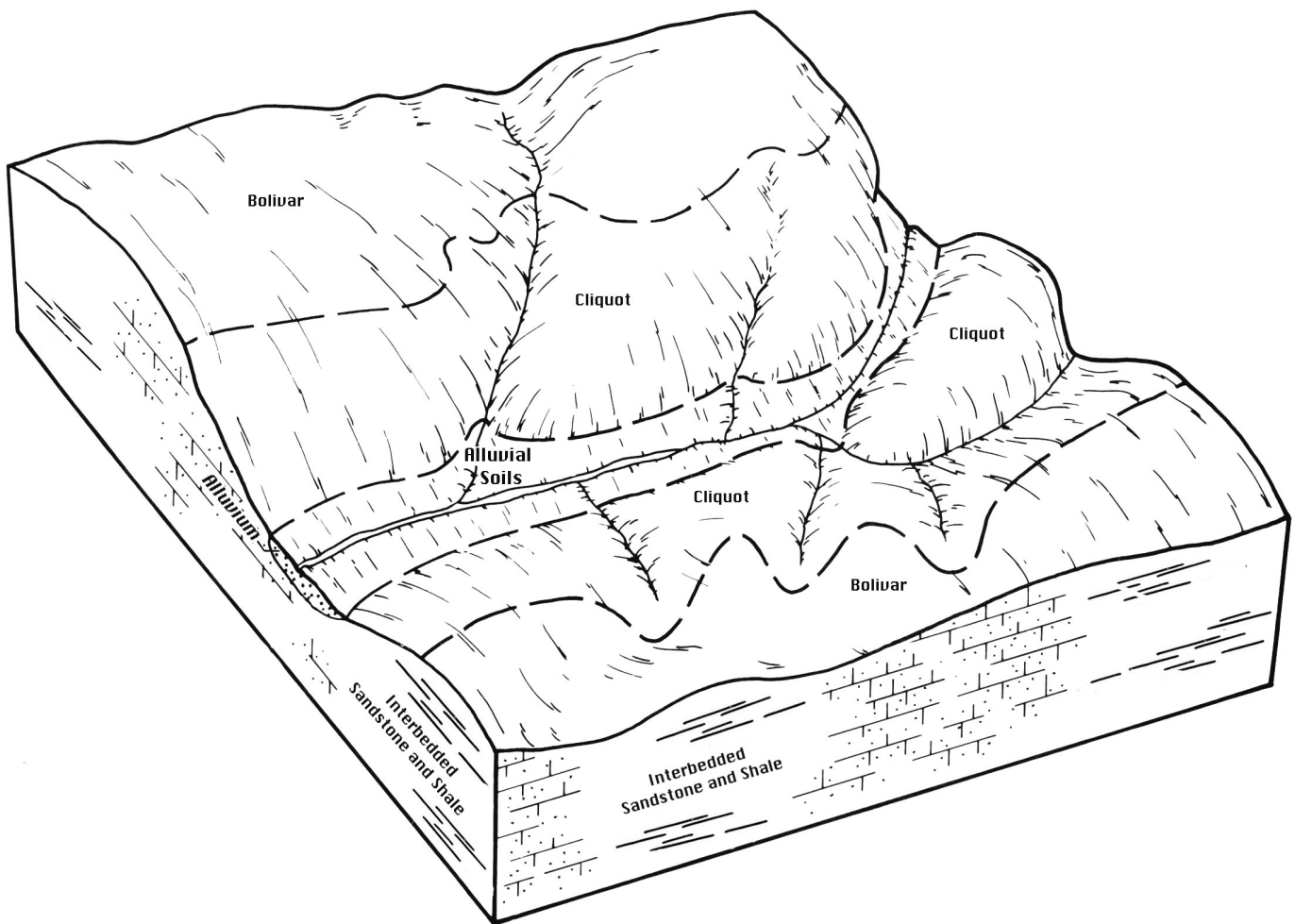


Figure 5.—Typical pattern of soils and parent material in the Cliquot-Bolivar association.

Extent of the soils in the association:

Cliquot and similar soils—50 percent

Bolivar and similar soils—20 percent

Minor soils

- Basehor soils on backslopes
- Hobson soils on summits
- Barden soils on summits
- Goss soils on backslopes

Landscape

Cliquot

Position on landform: Summit and backslope

Parent material: Colluvium over clayey residuum weathered from sandstone and shale

Slope: 3 to 15 percent

Bolivar

Position on landform: Summit

Parent material: Residuum weathered from sandstone

Slope: 3 to 8 percent

7. Dameron-Sturkie Association

Setting

Landform: Flood plain

Slope range: 0 to 3 percent

Composition

Extent of the association:

7 percent of the survey area

Extent of the soils in the association:

Dameron and similar soils—40 percent

Sturkie and similar soils—35 percent

Minor soils

- Hepler and Secesh soils on flood plain steps

Landscape

Sturkie

Position on landform: Flood plain

Parent material: Alluvium

Slope: 0 to 2 percent

Dameron

Position on landform: Flood plain

Parent material: Alluvium

Slope: 0 to 3 percent

Detailed Soil Map Units

The map units delineated on the detailed soil maps in this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The contrasting components are mentioned in the map unit descriptions. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Barden silt loam, 1 to 3 percent slopes, is a phase of the Barden series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are called complexes. A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Barco-Sylvania complex, 2 to 5 percent slopes, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits, quarries, is an example.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables give properties of the soils and the limitations, capabilities, and potentials for

many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

Soil Descriptions

15003—Basehor-Rock outcrop complex, 3 to 15 percent slopes

Setting

Landform: Hill on upland

Position on the landform: Backslope

Parent material: Basehor—residuum weathered from sandstone; Rock outcrop—no data

Slope shape: Basehor—convex; Rock outcrop—no data

Composition

Basehor and similar soils—70 percent

Rock outcrop—20 percent

Minor components—10 percent

Bolivar—summit on ridge on upland

Cliquot—summit on ridge on upland

Soil Properties and Qualities

Depth to bedrock: Basehor—very shallow and shallow (4 to 20 inches); Rock outcrop—no data

Runoff: Basehor—very high; Rock outcrop—no data

Flooding: None

Water table: None

Drainage class: Basehor—well drained; Rock outcrop—no data

Percent area covered by surface coarse fragments: None

Depth to restrictive feature (bedrock (lithic):

Basehor—10 to 20 inches; Rock outcrop—0 inches

Typical Profile

Basehor

A—0 to 5 inches; fine sandy loam

E—5 to 12 inches; fine sandy loam

Bw—12 to 16 inches; fine sandy loam

R—16 to 80 inches; unweathered bedrock

15004—Basehor fine sandy loam, 8 to 35 percent slopes, very stony, rocky

Setting

Landform: Hill on upland

Parent material: Residuum weathered from sandstone

Slope shape: Convex

Composition

Basehor and similar soils—90 percent

Minor components—10 percent

Cliquot—backslope on hill on upland

Rock outcrop

Soil Properties and Qualities

Depth to bedrock: Very shallow and shallow (4 to 20 inches)

Runoff: Very high

Flooding: None

Water table: None

Drainage class: Well drained

Percent area covered by surface coarse fragments: 0.10 to 2 (stones)

Depth to restrictive feature (bedrock (lithic): 10 to 20 inches

Typical Profile

A—0 to 2 inches; fine sandy loam

Bw1—2 to 10 inches; fine sandy loam

Bw2—10 to 16 inches; gravelly fine sandy loam

R—16 to 80 inches; unweathered bedrock

40000—Barden silt loam, 1 to 3 percent slopes (fig. 6)

Setting

Landform: Divide on upland

Position on the landform: Summit

Parent material: Loess over residuum weathered from clayey shale

Slope shape: Convex

Composition

Barden and similar soils—80 percent

Minor components—20 percent

Barco—summit on ridge on upland

Creldon—summit on divide on upland

Parsons—summit on divide on upland

Sylvania—summit on ridge on upland

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)

Runoff: High

Flooding: None

Water table: 24 to 36 inches

Drainage class: Moderately well drained

Percent area covered by surface coarse fragments: None

Depth to restrictive feature: None



Figure 6.—Soybean production in an area of Barden silt loam, 1 to 3 percent slopes.

Typical Profile

Ap—0 to 8 inches; silt loam
 Bt1—8 to 23 inches; silty clay
 Bt2—23 to 68 inches; silty clay loam
 Cr—68 to 74 inches; weathered bedrock

40003—Woodson silt loam, 1 to 3 percent slopes

Setting

Landform: Paleoterrace on river valley
Position on the landform: Toeslope

Parent material: Silty and clayey colluvium

Slope shape: Concave

Composition

Woodson and similar soils—90 percent
 Minor components—10 percent
 Hoberg—summit on ridge on upland
 Saturated soils

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Very high
Flooding: None
Water table: 6 to 24 inches
Drainage class: Somewhat poorly drained

Percent area covered by surface coarse fragments:

None

Depth to restrictive feature: None

Typical Profile

Ap—0 to 8 inches; silt loam

Btg—8 to 57 inches; clay

BCg—57 to 80 inches; clay loam

40004—Barden loam, 2 to 5 percent slopes

Setting

Landform: Hill on upland

Position on the landform: Footslope

Parent material: Loess over residuum weathered from clayey shale

Slope shape: Convex

Composition

Barden and similar soils—80 percent

Minor components—20 percent

Parsons—summit on divide on upland

Sylvania—backslope on hill on upland

Saturated soils

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)

Runoff: High

Flooding: None

Water table: 24 to 36 inches

Drainage class: Moderately well drained

Percent area covered by surface coarse fragments:

None

Depth to restrictive feature: None

Typical Profile

A—0 to 7 inches; loam

BA—7 to 16 inches; loam

Bt—16 to 65 inches; clay

BC—65 to 80 inches; clay loam

40005—Sylvania loam, 5 to 15 percent slopes, very stony

Setting

Landform: Hill on upland

Position on the landform: Backslope

Parent material: Colluvium over clayey residuum weathered from sandstone and shale

Slope shape: Convex

Composition

Sylvania and similar soils—90 percent

Minor components—10 percent

Barco—summit on ridge on upland

Basehor—backslope on hill on upland

Soil Properties and Qualities

Depth to bedrock: Deep (40 to 60 inches)

Runoff: High

Flooding: None

Water table: 30 to 48 inches

Drainage class: Moderately well drained

Percent area covered by surface coarse fragments:

0.10 to 3 (subangular stones)

Depth to restrictive feature (bedrock (paralithic)): 40 to 60 inches

Typical Profile

Ap—0 to 6 inches; loam

A—6 to 11 inches; gravelly loam

BA—11 to 15 inches; very gravelly sandy clay loam

2Bt—15 to 45 inches; clay

2Cr—45 to 55 inches; weathered bedrock

40006—Barco-Sylvania complex, 2 to 5 percent slopes (fig. 7)

Setting

Landform: Ridge on upland

Position on the landform: Summit

Parent material: Barco—residuum weathered from sandstone; Sylvania—colluvium over clayey residuum weathered from sandstone and shale

Slope shape: Convex

Composition

Barco and similar soils—55 percent

Sylvania and similar soils—35 percent

Minor components—10 percent

Barden—summit on divide on upland

Bona—shoulder on ridge on upland

Soil Properties and Qualities

Depth to bedrock: Barco—moderately deep (20 to 40 inches); Sylvania—deep (40 to 60 inches)

Runoff: Barco—high; Sylvania—medium

Flooding: None

Water table: Barco—none; Sylvania—30 to 48 inches



Figure 7.—An area of Barco-Sylvania complex, 2 to 5 percent slopes, used as pastureland.

Drainage class: Barco—well drained;
Sylvania—moderately well drained

Percent area covered by surface coarse fragments:
None

Depth to restrictive feature (bedrock (paralithic):
Barco—20 to 40 inches; Sylvania—40 to 60 inches

Typical Profile

Barco

A—0 to 7 inches; loam
AB—7 to 14 inches; loam
Bt1—14 to 23 inches; loam
Bt2—23 to 31 inches; cobbly clay loam
Cr—31 to 39 inches; weathered bedrock
R—39 to 80 inches; unweathered bedrock

Sylvania

A—0 to 10 inches; loam
BA—10 to 16 inches; loam
Bt—16 to 32 inches; clay loam
BC—32 to 49 inches; gravelly loam
Cr—49 to 60 inches; unweathered bedrock

40007—Eldorado gravelly loam, 3 to 15 percent slopes, very stony

Setting

Landform: Hill on upland
Position on the landform: Shoulder

Parent material: Gravelly colluvium over clayey residuum weathered from cherty limestone
Slope shape: Convex

Composition

Eldorado and similar soils—90 percent
 Minor components—10 percent
 Hoberg—summit on ridge on upland

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Medium
Flooding: None
Water table: None
Drainage class: Well drained
Percent area covered by surface coarse fragments:
 0.10 to 3 (subrounded stones)
Depth to restrictive feature: None

Typical Profile

A1—0 to 8 inches; gravelly loam
 A2—8 to 13 inches; cobbly loam
 Bt1—13 to 33 inches; very cobbly clay loam
 2Bt2—33 to 60 inches; very cobbly clay

40008—Parsons silt loam, 0 to 2 percent slopes

Setting

Landform: Divide on upland
Position on the landform: Summit
Parent material: Silty and clayey colluvium
Slope shape: Concave

Composition

Parsons and similar soils—90 percent
 Minor components—10 percent
 Barden—summit on divide on upland
 Creldon—summit on divide on upland

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Negligible
Flooding: None
Water table: 6 to 18 inches
Drainage class: Somewhat poorly drained
Percent area covered by surface coarse fragments:
 None
Depth to restrictive feature: None

Typical Profile

A—0 to 8 inches; silt loam
 E—8 to 16 inches; silt loam
 Btg1—16 to 31 inches; clay
 Btg2—31 to 60 inches; silty clay loam

44000—Cherokee silt loam, 0 to 1 percent slope

Setting

Landform: Paleoterrace on river valley
Position on the landform: Toeslope
Parent material: Loess over silty and clayey colluvium
Slope shape: Concave

Composition

Cherokee and similar soils—90 percent
 Minor components—10 percent
 Barden—summit on divide on upland
 Hepler—flood-plain step on river valley

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Negligible
Flooding: None
Water table: 6 to 18 inches
Drainage class: Somewhat poorly drained
Percent area covered by surface coarse fragments:
 None
Depth to restrictive feature: None

Typical Profile

Ap—0 to 7 inches; silt loam
 Eg—7 to 13 inches; silt loam
 Btg—13 to 32 inches; clay
 2Btg2—32 to 52 inches; silty clay loam
 2BCg—52 to 70 inches; silty clay loam

46001—Verdigris silt loam, 0 to 1 percent slope, frequently flooded

Setting

Landform: Flood plain on river valley
Parent material: Silty alluvium
Slope shape: Linear

Composition

Verdigris and similar soils—95 percent
 Minor components—5 percent
 Hepler—flood-plain step on river valley

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Low
Flooding: Frequent
Water table: None
Drainage class: Well drained
Percent area covered by surface coarse fragments:
 None
Depth to restrictive feature: None

Typical Profile

A—0 to 20 inches; silt loam
 Bw—20 to 60 inches; silt loam

46002—Hepler silt loam, 0 to 1 percent slope, occasionally flooded**Setting**

Landform: Flood-plain step on river valley
Parent material: Silty alluvium
Slope shape: Linear

Composition

Hepler and similar soils—85 percent
 Minor components—15 percent
 Dameron—flood plain on river valley
 Humansville—flood plain on river valley
 Sturkie—flood plain on river valley

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Low
Flooding: Occasional
Water table: 12 to 36 inches
Drainage class: Somewhat poorly drained
Percent area covered by surface coarse fragments:
 None
Depth to restrictive feature: None

Typical Profile

Ap—0 to 9 inches; silt loam
 E—9 to 16 inches; silt loam
 Btg—16 to 60 inches; silt loam

66001—Dameron silt loam, 0 to 3 percent slopes, frequently flooded**Setting**

Landform: Flood plain on river valley
Parent material: Alluvium
Slope shape: Linear

Composition

Dameron and similar soils—90 percent
 Minor components—10 percent
 Horsecreek—stream terrace
 Secesh—flood-plain step on river valley

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Low
Flooding: Frequent
Water table: None
Drainage class: Well drained
Percent area covered by surface coarse fragments:
 None
Depth to restrictive feature: None

Typical Profile

Ap—0 to 9 inches; silt loam
 A—9 to 15 inches; silty clay loam
 Bw1—15 to 24 inches; very gravelly clay loam
 Bw2—24 to 72 inches; silty clay loam
 Bw3—72 to 80 inches; extremely gravelly clay loam

70000—Bona gravelly silt loam, 3 to 8 percent slopes**Setting**

Landform: Ridge on upland
Position on the landform: Shoulder
Parent material: Gravelly colluvium over clayey residuum weathered from cherty limestone
Slope shape: Convex

Composition

Bona and similar soils—90 percent
 Minor components—10 percent
 Hoberg—summit on ridge on upland

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: High
Flooding: None

Water table: None
Drainage class: Well drained
Percent area covered by surface coarse fragments:
 None
Depth to restrictive feature (bedrock (lithic): 60 to 80 inches

Typical Profile

Ap—0 to 6 inches; gravelly silt loam
 A—6 to 18 inches; very gravelly silt loam
 Bt1—18 to 24 inches; extremely gravelly silt loam
 2Bt2—24 to 30 inches; very gravelly clay
 3Bt3—30 to 72 inches; clay
 3R—72 to 80 inches; unweathered bedrock

70006—Credon silt loam, 1 to 3 percent slopes (fig. 8)

Setting

Landform: Divide on upland
Position on the landform: Summit
Parent material: Loess over gravelly colluvium over clayey residuum weathered from cherty limestone
Slope shape: Convex

Composition

Credon and similar soils—90 percent
 Minor components—10 percent
 Barden—summit on divide on upland
 Woodson—toeslope on paleoterrace on river valley

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Medium
Flooding: None
Water table: 18 to 36 inches
Drainage class: Moderately well drained
Percent area covered by surface coarse fragments:
 None
Depth to restrictive feature (fragipan): 18 to 35 inches

Typical Profile

Ap—0 to 8 inches; silt loam
 Bt—8 to 27 inches; silty clay
 2Btx—27 to 37 inches; very gravelly silt loam
 3Bt—37 to 60 inches; very gravelly clay

70007—Cliquot gravelly loam, 8 to 15 percent slopes

Setting

Landform: Hill on upland
Position on the landform: Backslope
Parent material: Colluvium over clayey residuum weathered from sandstone and shale
Slope shape: Convex

Composition

Cliquot and similar soils—90 percent
 Minor components—10 percent
 Basehor—backslope on hill on upland
 Bolivar—summit on ridge on upland

Soil Properties and Qualities

Depth to bedrock: Deep (40 to 60 inches)
Runoff: Very high
Flooding: None
Water table: 42 to 54 inches
Drainage class: Moderately well drained
Percent area covered by surface coarse fragments:
 None
Depth to restrictive feature (bedrock (paralithic): 40 to 60 inches

Typical Profile

A—0 to 5 inches; gravelly loam
 E—5 to 26 inches; very gravelly loam
 2Bt1—26 to 49 inches; channery silty clay loam
 2Bt2—49 to 55 inches; channery silty clay
 2Cr—55 to 63 inches; weathered bedrock
 2R—63 to 80 inches; unweathered bedrock

70008—Goss gravelly silt loam, 3 to 8 percent slopes

Setting

Landform: Ridge on upland
Position on the landform: Shoulder
Parent material: Gravelly colluvium over clayey residuum weathered from cherty limestone
Slope shape: Convex



Figure 8.—Corn production in an irrigated area of Crelton silt loam, 1 to 3 percent slopes.

Composition

Goss and similar soils—85 percent
 Minor components—15 percent
 Viraton—summit on ridge
 Moko—backslope on hill
 Wilderness—shoulder on ridge on upland

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Medium
Flooding: None
Water table: None
Drainage class: Well drained
Percent area covered by surface coarse fragments:
 None
Depth to restrictive feature: None

Typical Profile

Ap—0 to 6 inches; gravelly silt loam
 BE—6 to 10 inches; very gravelly silt loam
 Bt1—10 to 14 inches; very gravelly silty clay loam
 2Bt2—14 to 80 inches; gravelly clay

70009—Goss gravelly silt loam, 8 to 15 percent slopes**Setting**

Landform: Hill on upland
Position on the landform: Backslope
Parent material: Gravelly colluvium over clayey residuum weathered from cherty limestone
Slope shape: Convex

Composition

Goss and similar soils—80 percent
 Minor components—20 percent
 Alsup—backslope on hill
 Sacville—hill
 Viraton—summit on ridge
 Wilderness—shoulder on ridge on upland

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Medium
Flooding: None
Water table: None
Drainage class: Well drained
Percent area covered by surface coarse fragments:
 None
Depth to restrictive feature: None

Typical Profile

A—0 to 4 inches; gravelly silt loam
 E—4 to 10 inches; very cobbly silt loam
 Bt1—10 to 16 inches; very cobbly silt loam
 2Bt2—16 to 60 inches; very cobbly clay

70010—Goss very cobbly silt loam, 15 to 35 percent slopes**Setting**

Landform: Hill on upland
Position on the landform: Backslope
Parent material: Gravelly colluvium over clayey residuum weathered from cherty limestone
Slope shape: Convex

Composition

Goss and similar soils—90 percent
 Minor components—10 percent
 Alsup—backslope on hill
 Moko—backslope on hill
 Pomme—summit on strath terrace

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Very high
Flooding: None
Water table: None
Drainage class: Well drained
Percent area covered by surface coarse fragments:
 None
Depth to restrictive feature: None

Typical Profile

A—0 to 3 inches; very cobbly silt loam
 E—3 to 15 inches; very cobbly silt loam
 Bt1—15 to 21 inches; extremely gravelly silt loam
 2Bt2—21 to 60 inches; very gravelly clay

70012—Hoberg silt loam, 2 to 5 percent slopes**Setting**

Landform: Ridge on upland
Position on the landform: Summit
Parent material: Fine-loamy colluvium over clayey residuum weathered from cherty limestone
Slope shape: Convex

Composition

Hoberg and similar soils—90 percent
 Minor components—10 percent
 Bona—shoulder on ridge on upland
 Wanda—footslope on paleoterrace on river valley

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Medium
Flooding: None
Water table: 12 to 36 inches
Drainage class: Moderately well drained
Percent area covered by surface coarse fragments:
 None
Depth to restrictive feature (fragipan): 20 to 36 inches

Typical Profile

Ap—0 to 12 inches; silt loam
 Bt—12 to 26 inches; silt loam
 2Btx—26 to 42 inches; extremely cobbly silty clay loam
 3Bt—42 to 62 inches; extremely cobbly clay

70014—Moko-Rock outcrop complex, 15 to 35 percent slopes, very stony**Setting**

Landform: Hill on upland
Position on the landform: Backslope
Parent material: Gravelly residuum weathered from cherty limestone
Slope shape: Convex

Composition

Moko and similar soils—55 percent
 Rock outcrop—35 percent
 Minor components—10 percent
 Sonsac—backslope on hill on upland
 Goss—backslope on hill on upland

Soil Properties and Qualities

Depth to bedrock: Very shallow and shallow (4 to 20 inches)
Runoff: Very high
Flooding: None
Water table: None
Drainage class: Well drained
Percent area covered by surface coarse fragments:
 0.10 to 3 (subangular stones)
Depth to restrictive feature (bedrock (lithic): 4 to 20 inches

Typical Profile**Moko**

A1—0 to 5 inches; very gravelly clay loam
 A2—5 to 13 inches; extremely channery clay loam
 R—13 to 80 inches; unweathered bedrock

70040—Cliquot-Bolivar complex, 3 to 8 percent slopes**Setting**

Landform: Cliquot—ridge on upland; Bolivar—summit
Parent material: Cliquot—colluvium over clayey residuum weathered from sandstone and shale; Bolivar—residuum weathered from sandstone
Slope shape: Convex

Composition

Cliquot and similar soils—55 percent
 Bolivar and similar soils—35 percent
 Minor components—10 percent
 Basehor—backslope on hill on upland
 Hobson—summit on ridge on upland
 Soils with very gravelly surface layers

Soil Properties and Qualities

Depth to bedrock: Cliquot—deep (40 to 60 inches); Bolivar—moderately deep (20 to 40 inches)
Runoff: Cliquot—high; Bolivar—very high
Flooding: None
Water table: Cliquot—42 to 54 inches; Bolivar—none
Drainage class: Cliquot—moderately well drained; Bolivar—well drained
Percent area covered by surface coarse fragments:
 None
Depth to restrictive feature (bedrock (paralithic):
 Cliquot—40 to 60 inches; Bolivar—20 to 40 inches

Typical Profile**Cliquot**

A—0 to 3 inches; fine sandy loam
 E—3 to 13 inches; very gravelly fine sandy loam
 2Bt1—13 to 20 inches; clay
 2Bt2—20 to 31 inches; channery clay
 2Bt3—31 to 41 inches; channery clay
 2Cr—41 to 48 inches; weathered bedrock
 2R—48 to 80 inches; unweathered bedrock

Bolivar

Ap—0 to 7 inches; fine sandy loam
 E—7 to 13 inches; fine sandy loam
 Bt1—13 to 18 inches; gravelly sandy clay loam
 Bt2—18 to 26 inches; very flaggy sandy clay loam
 Cr—26 to 38 inches; weathered bedrock
 R—38 to 80 inches; unweathered bedrock

**70041—Goss very gravelly silt loam,
 8 to 15 percent slopes**

Setting

Landform: Hill on upland
Parent material: Gravelly colluvium over clayey
 residuum weathered from cherty limestone
Slope shape: Convex

Composition

Goss and similar soils—90 percent
 Minor components—10 percent
 Moko—interfluvium on hill on upland
 Sonsac—side slope on hill on upland
 Wilderness—shoulder on ridge on upland

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Medium
Flooding: None
Water table: None
Drainage class: Well drained
Percent area covered by surface coarse fragments:
 None
Depth to restrictive feature: None

Typical Profile

Ap—0 to 5 inches; very gravelly silt loam
 E—5 to 16 inches; very cobbly silt loam
 Bt1—16 to 22 inches; very cobbly silty clay loam
 2Bt2—22 to 30 inches; very cobbly silty clay
 2Bt3—30 to 60 inches; very cobbly clay

**70042—Goss very gravelly silt loam,
 15 to 35 percent slopes**

Setting

Landform: Hill on upland
Position on the landform: Backslope

Parent material: Gravelly colluvium over clayey
 residuum weathered from cherty limestone
Slope shape: Convex

Composition

Goss and similar soils—85 percent
 Minor components—15 percent
 Moko—backslope on hill on upland
 Pomme—summit on strath terrace on river valley
 Sonsac—backslope on hill on upland

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Medium
Flooding: None
Water table: None
Drainage class: Well drained
Percent area covered by surface coarse fragments:
 None
Depth to restrictive feature: None

Typical Profile

A—0 to 2 inches; very gravelly silt loam
 E—2 to 10 inches; very gravelly silt loam
 BE—10 to 16 inches; very gravelly silt loam
 Bt1—16 to 55 inches; very gravelly silty clay loam
 2Bt2—55 to 68 inches; very gravelly clay

**70043—Sonsac-Moko-Rock outcrop
 complex, 3 to 15 percent slopes**

Setting

Landform: Hill on upland
Position on the landform: Backslope
Parent material: Sonsac—gravelly colluvium over clayey
 residuum weathered from cherty limestone;
 Moko—gravelly residuum weathered from cherty
 limestone; Rock outcrop—no data
Slope shape: Sonsac—convex; Moko—concave; Rock
 outcrop—no data

Composition

Sonsac and similar soils—50 percent
 Moko and similar soils—25 percent
 Rock outcrop—15 percent
 Minor components—10 percent
 Goss—backslope on hill on upland
 Wilderness—shoulder on ridge on upland

Soil Properties and Qualities

Depth to bedrock: Sonsac—moderately deep (20 to 40 inches); Moko—very shallow and shallow (4 to 20 inches); Rock outcrop—no data

Runoff: Sonsac and Moko—very high; Rock outcrop—no data

Flooding: None

Water table: None

Drainage class: Sonsac and Moko—well drained; Rock outcrop—no data

Percent area covered by surface coarse fragments: None

Depth to restrictive feature (bedrock (lithic):
Sonsac—20 to 40 inches; Moko—4 to 20 inches;
Rock outcrop—0 inches

Typical Profile**Sonsac**

A—0 to 3 inches; very cobbly silt loam
BA—3 to 6 inches; very cobbly silt loam
Bt—6 to 9 inches; very cobbly silty clay loam
2Bt—9 to 31 inches; very cobbly clay
2R—31 to 80 inches; unweathered bedrock

Moko

A1—0 to 5 inches; very gravelly silty clay loam
A2—5 to 12 inches; very gravelly silty clay loam
R—12 to 80 inches; unweathered bedrock

70044—Sonsac-Moko complex, 15 to 35 percent slopes, rocky***Setting***

Landform: Hill on upland

Position on the landform: Backslope

Parent material: Sonsac—gravelly colluvium over clayey residuum weathered from cherty limestone;
Moko—gravelly residuum weathered from cherty limestone

Slope shape: Convex

Composition

Sonsac and similar soils—60 percent
Moko and similar soils—30 percent
Minor components—10 percent
Goss—backslope on hill on upland
Rock outcrop

Soil Properties and Qualities

Depth to bedrock: Sonsac—moderately deep (20 to 40 inches); Moko—very shallow and shallow (4 to 20 inches)

Runoff: Very high

Flooding: None

Water table: None

Drainage class: Well drained

Percent area covered by surface coarse fragments: None

Depth to restrictive feature (bedrock (lithic):
Sonsac—20 to 40 inches; Moko—4 to 20 inches

Typical Profile**Sonsac**

A—0 to 4 inches; gravelly silt loam
BE—4 to 13 inches; very gravelly silt loam
Bt—13 to 22 inches; extremely cobbly silty clay loam
2Bt—22 to 37 inches; very cobbly clay
2R—37 to 80 inches; unweathered bedrock

Moko

A1—0 to 6 inches; gravelly silt loam
A2—6 to 14 inches; very gravelly silty clay loam
R—14 to 80 inches; unweathered bedrock

70045—Keeno gravelly silt loam, 3 to 8 percent slopes***Setting***

Landform: Ridge on upland

Position on the landform: Shoulder

Parent material: Gravelly colluvium over clayey residuum weathered from cherty limestone

Slope shape: Convex

Composition

Keeno and similar soils—90 percent
Minor components—10 percent
Bona—shoulder on ridge on upland
Hoberg—summit on ridge on upland

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)

Runoff: High

Flooding: None

Water table: 18 to 30 inches

Drainage class: Moderately well drained

Percent area covered by surface coarse fragments: None

Depth to restrictive feature (fragipan): 18 to 36 inches

Typical Profile

A—0 to 6 inches; gravelly silt loam
 Bt—6 to 19 inches; very gravelly silty clay loam
 Btx—19 to 29 inches; extremely gravelly silt loam
 2Bt—29 to 60 inches; extremely gravelly clay

70047—Wanda silt loam, 2 to 5 percent slopes**Setting**

Landform: Paleoterrace on river valley
Position on the landform: Foothlope
Parent material: Loess over gravelly colluvium
Slope shape: Convex

Composition

Wanda and similar soils—90 percent
 Minor components—10 percent
 Bona—shoulder on ridge on upland
 Hoberg—summit on ridge on upland

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Low
Flooding: None
Water table: None
Drainage class: Well drained
Percent area covered by surface coarse fragments:
 None
Depth to restrictive feature: None

Typical Profile

Ap—0 to 15 inches; silt loam
 Bt1—15 to 26 inches; silty clay loam
 Bt2—26 to 44 inches; silty clay loam
 2Bt3—44 to 60 inches; gravelly silty clay loam

70048—Alsup silt loam, 8 to 15 percent slopes, very stony**Setting**

Landform: Hill on upland
Position on the landform: Backslope
Parent material: Colluvium over clayey residuum weathered from shale and siltstone
Slope shape: Convex

Composition

Alsup and similar soils—90 percent
 Minor components—10 percent
 Goss—backslope on hill on upland
 Hartville—footslope on paleoterrace on river valley

Soil Properties and Qualities

Depth to bedrock: Deep (40 to 60 inches)
Runoff: Medium
Flooding: None
Water table: 30 to 48 inches
Drainage class: Moderately well drained
Percent area covered by surface coarse fragments: 1 to 3 (subangular flagstones)
Depth to restrictive feature (bedrock (paralithic)): 40 to 60 inches

Typical Profile

A—0 to 5 inches; silt loam
 E—5 to 14 inches; gravelly silt loam
 BE—14 to 24 inches; very gravelly silt loam
 2Bt—24 to 50 inches; silty clay
 2Cr—50 to 60 inches; weathered bedrock

73000—Pomme silt loam, 3 to 8 percent slopes**Setting**

Landform: Strath terrace on river valley
Position on the landform: Summit
Parent material: Loess over gravelly colluvium over clayey residuum weathered from cherty limestone
Slope shape: Concave

Composition

Pomme and similar soils—85 percent
 Minor components—15 percent
 Goss—shoulder on ridge on upland
 Hartville—footslope on paleoterrace on river valley
 Sonsac—backslope on hill on upland

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Medium
Flooding: None
Water table: None
Drainage class: Well drained
Percent area covered by surface coarse fragments:
 None
Depth to restrictive feature: None

Typical Profile

Ap—0 to 7 inches; silt loam
 Bt1—7 to 19 inches; silty clay loam
 2Bt2—19 to 57 inches; very gravelly silty clay loam
 3Bt3—57 to 86 inches; extremely gravelly clay

73008—Viraton silt loam, 2 to 5 percent slopes**Setting**

Landform: Ridge on upland
Position on the landform: Summit
Parent material: Fine-loamy colluvium over gravelly colluvium over residuum
Slope shape: Convex

Composition

Viraton and similar soils—95 percent
 Minor components—5 percent
 Goss—ridge on upland

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: High
Flooding: None
Water table: 18 to 30 inches
Drainage class: Moderately well drained
Percent area covered by surface coarse fragments: None
Depth to restrictive feature (fragipan): 18 to 33 inches

Typical Profile

Ap—0 to 6 inches; silt loam
 Bt—6 to 21 inches; silt loam
 2Btx—21 to 30 inches; very gravelly silty clay loam
 3Bt—30 to 60 inches; gravelly clay

73010—Wilderness gravelly silt loam, 3 to 8 percent slopes**Setting**

Landform: Ridge on upland
Position on the landform: Shoulder
Parent material: Gravelly colluvium over clayey residuum weathered from cherty limestone
Slope shape: Convex

Composition

Wilderness and similar soils—95 percent
 Minor components—5 percent
 Goss—side slope on hill on upland
 Viraton—interfluvium on ridge on upland

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: High
Flooding: None
Water table: 12 to 24 inches
Drainage class: Moderately well drained
Percent area covered by surface coarse fragments: None
Depth to restrictive feature (fragipan): 15 to 29 inches

Typical Profile

Ap—0 to 6 inches; gravelly silt loam
 E—6 to 11 inches; gravelly silt loam
 Bt—11 to 25 inches; very gravelly silt loam
 Btx—25 to 32 inches; very gravelly silt loam
 2Bt—32 to 60 inches; gravelly clay

73031—Gerald silt loam, 0 to 2 percent slopes**Setting**

Landform: Divide on upland
Position on the landform: Summit
Parent material: Loess over gravelly colluvium over clayey residuum weathered from cherty limestone
Slope shape: Concave

Composition

Gerald and similar soils—90 percent
 Minor components—10 percent
 Barden—summit on divide on upland
 Creldon—summit on divide on upland

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Negligible
Flooding: None
Water table: 12 to 24 inches
Drainage class: Somewhat poorly drained
Percent area covered by surface coarse fragments: None
Depth to restrictive feature (fragipan): 20 to 40 inches

Typical Profile

Ap—0 to 11 inches; silt loam
 E—11 to 16 inches; silt loam
 Bt—16 to 33 inches; silty clay
 2Btx—33 to 49 inches; gravelly silty clay loam
 3Bt—49 to 77 inches; cobbly clay

73059—Pomme silt loam, 1 to 3 percent slopes**Setting**

Landform: Strath terrace on river valley
Position on the landform: Summit
Parent material: Loess over gravelly colluvium over clayey residuum weathered from cherty limestone
Slope shape: Convex

Composition

Pomme and similar soils—85 percent
 Minor components—15 percent
 Goss—shoulder on ridge on upland
 Hartville—footslope on paleoterrace on river valley
 Sonsac—backslope on hill on upland

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Low
Flooding: None
Water table: None
Drainage class: Well drained
Percent area covered by surface coarse fragments: None
Depth to restrictive feature: None

Typical Profile

Ap—0 to 8 inches; silt loam
 Bt—8 to 26 inches; silt loam
 2Bt—26 to 44 inches; gravelly loam
 3Bt—44 to 72 inches; gravelly clay

73065—Wilderness very cobbly silt loam, 3 to 8 percent slopes, very stony**Setting**

Landform: Ridge on upland
Position on the landform: Shoulder

Parent material: Gravelly colluvium over clayey residuum weathered from cherty limestone
Slope shape: Convex

Composition

Wilderness and similar soils—90 percent
 Minor components—10 percent
 Goss—shoulder on ridge on upland
 Viraton—summit on ridge on upland

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: Medium
Flooding: None
Water table: 12 to 24 inches
Drainage class: Moderately well drained
Percent area covered by surface coarse fragments: 0.10 to 3 (stones)
Depth to restrictive feature (fragipan): 15 to 29 inches

Typical Profile

A—0 to 7 inches; very cobbly silt loam
 Bt—7 to 23 inches; very gravelly silt loam
 Btx—23 to 33 inches; extremely gravelly clay loam
 2Bt—33 to 70 inches; clay

73075—Hobson loam, 1 to 3 percent slopes (fig. 9)**Setting**

Landform: Ridge on upland
Position on the landform: Summit
Parent material: Loamy colluvium over residuum weathered from sandstone and shale
Slope shape: Convex

Composition

Hobson and similar soils—90 percent
 Minor components—10 percent
 Bolivar—summit on ridge on upland
 Cliquot—summit on ridge on upland
 Clayey subsoil

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: High
Flooding: None
Water table: 18 to 36 inches
Drainage class: Moderately well drained
Percent area covered by surface coarse fragments: None
Depth to restrictive feature (fragipan): 18 to 27 inches



Figure 9.—Hay production in an area of Hobson loam, 1 to 3 percent slopes.

Typical Profile

Ap—0 to 4 inches; loam
 E—4 to 8 inches; loam
 Bt—8 to 19 inches; loam
 2Btx—19 to 40 inches; clay loam
 3Bt—40 to 72 inches; clay loam

74625—Hartville silt loam, 3 to 8 percent slopes

Setting

Landform: Paleoterrace on river valley

Parent material: Silty alluvium over clayey colluvium
Slope shape: Convex

Composition

Hartville and similar soils—90 percent
 Minor components—10 percent
 Alsup—backslope on hill on upland
 Pomme—summit on strath terrace on river valley

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)
Runoff: High
Flooding: None
Water table: 18 to 36 inches
Drainage class: Somewhat poorly drained

Percent area covered by surface coarse fragments:

None

Depth to restrictive feature: None

Typical Profile

Ap—0 to 6 inches; silt loam

BE—6 to 10 inches; silt loam

Bt—10 to 31 inches; silty clay

2Bt—31 to 60 inches; silty clay loam

74641—Secesh silt loam, 0 to 2 percent slopes, occasionally flooded

Setting

Landform: Flood-plain step on river valley

Parent material: Loamy alluvium over gravelly residuum weathered from cherty limestone

Slope shape: Convex

Composition

Secesh and similar soils—95 percent

Minor components—5 percent

Dameron—flood plain on river valley

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)

Runoff: Low

Flooding: Occasional

Water table: None

Drainage class: Well drained

Percent area covered by surface coarse fragments:

None

Depth to restrictive feature: None

Typical Profile

Ap—0 to 8 inches; silt loam

BA—8 to 14 inches; silt loam

Bt—14 to 24 inches; loam

2Bt—24 to 60 inches; gravelly clay loam

75378—Sturkie silt loam, 0 to 2 percent slopes, frequently flooded

Setting

Landform: Flood plain on river valley

Parent material: Silty alluvium

Slope shape: Linear

Composition

Sturkie and similar soils—90 percent

Minor components—10 percent

Dameron—flood plain on river valley

Hepler—tread on flood-plain step on river valley

Horsecreek—tread on terrace on river valley

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)

Runoff: Negligible

Flooding: Frequent

Water table: None

Drainage class: Well drained

Percent area covered by surface coarse fragments:

None

Depth to restrictive feature: None

Typical Profile

Ap—0 to 8 inches; silt loam

Bw—8 to 53 inches; silty clay loam

C—53 to 72 inches; silty clay loam

99000—Pits, quarries

Setting

Landform: None assigned

Parent material: No data

Composition

Pits, quarries—95 percent

Minor components—5 percent

Processed/stockpiled stone

99001—Water

Setting

Landform: None assigned

Parent material: No data

Composition

Water—100 percent

Minor components—0 percent

99004—Kanima very channery silt loam, 8 to 50 percent slopes***Setting***

Landform: Hill on upland

Position on the landform: Backslope

Parent material: Loamy mine spoil or earthy fill derived from sandstone and shale

Slope shape: Convex

Composition

Kanima and similar soils—100 percent

Minor components—0 percent

Soil Properties and Qualities

Depth to bedrock: Very deep (more than 60 inches)

Runoff: High

Flooding: None

Water table: None

Drainage class: Well drained

Percent area covered by surface coarse fragments: None

Depth to restrictive feature: None

Typical Profile

A—0 to 8 inches; very channery silt loam

C—8 to 60 inches; very channery silt loam

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
15003	Basehor-Rock outcrop complex, 3 to 15 percent slopes-----	2,863	0.9
15004	Basehor fine sandy loam, 8 to 35 percent slopes, very stony, rocky-----	230	*
40000	Barden silt loam, 1 to 3 percent slopes-----	34,827	10.8
40003	Woodson silt loam, 1 to 3 percent slopes-----	3,111	1.0
40004	Barden loam, 2 to 5 percent slopes-----	5,675	1.8
40005	Sylvania loam, 5 to 15 percent slopes, very stony-----	7,259	2.2
40006	Barco-Sylvania complex, 2 to 5 percent slopes-----	9,720	3.0
40007	Eldorado gravelly loam, 3 to 15 percent slopes, very stony-----	4,382	1.4
40008	Parsons silt loam, 0 to 2 percent slopes-----	11,117	3.4
44000	Cherokee silt loam, 0 to 1 percent slope-----	1,746	0.5
46001	Verdigris silt loam, 0 to 1 percent slope, frequently flooded-----	1,741	0.5
46002	Hepler silt loam, 0 to 1 percent slope, occasionally flooded-----	1,708	0.5
66001	Dameron silt loam, 0 to 3 percent slopes, frequently flooded-----	9,242	2.9
70000	Bona gravelly silt loam, 3 to 8 percent slopes-----	8,534	2.6
70006	Creldon silt loam, 1 to 3 percent slopes-----	21,901	6.8
70007	Cliquot gravelly loam, 8 to 15 percent slopes-----	11,271	3.5
70008	Goss gravelly silt loam, 3 to 8 percent slopes-----	33,032	10.2
70009	Goss gravelly silt loam, 8 to 15 percent slopes-----	1,129	0.3
70010	Goss very cobbly silt loam, 15 to 35 percent slopes-----	39	*
70012	Hoberg silt loam, 2 to 5 percent slopes-----	9,951	3.1
70014	Moko-Rock outcrop complex, 15 to 35 percent slopes, very stony-----	2,148	0.7
70040	Cliquot-Bolivar complex, 3 to 8 percent slopes-----	21,630	6.7
70041	Goss very gravelly silt loam, 8 to 15 percent slopes-----	30,606	9.4
70042	Goss very gravelly silt loam, 15 to 35 percent slopes-----	11,280	3.5
70043	Sonsac-Moko-Rock outcrop complex, 3 to 15 percent slopes-----	16,027	4.9
70044	Sonsac-Moko complex, 15 to 35 percent slopes, rocky-----	9,036	2.8
70045	Keeno gravelly silt loam, 3 to 8 percent slopes-----	1,473	0.5
70047	Wanda silt loam, 2 to 5 percent slopes-----	2,553	0.8
70048	Alsup silt loam, 8 to 15 percent slopes, very stony-----	1,934	0.6
73000	Pomme silt loam, 3 to 8 percent slopes-----	6,229	1.9
73008	Viraton silt loam, 2 to 5 percent slopes-----	4,078	1.3
73010	Wilderness gravelly silt loam, 3 to 8 percent slopes-----	2,300	0.7
73031	Gerald silt loam, 0 to 2 percent slopes-----	479	0.1
73059	Pomme silt loam, 1 to 3 percent slopes-----	8,146	2.5
73065	Wilderness very cobbly silt loam, 3 to 8 percent slopes, very stony-----	1,141	0.4
73075	Hobson loam, 1 to 3 percent slopes-----	2,922	0.9
74625	Hartville silt loam, 3 to 8 percent slopes-----	1,057	0.3
74641	Secesh silt loam, 0 to 2 percent slopes, occasionally flooded-----	4,869	1.5
75378	Sturkie silt loam, 0 to 2 percent slopes, frequently flooded-----	6,136	1.9
99000	Pits, quarries-----	178	*
99001	Water-----	10,003	3.1
99004	Kanima very channery silt loam, 8 to 50 percent slopes-----	239	*
	Total-----	323,942	100.0

* Less than 0.1 percent.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 129,200 acres in the survey area, or nearly 40 percent of the total acreage, meets the soil requirements for prime farmland.

A recent trend in land use in some parts of the survey area has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed below. This list does not constitute a recommendation for a particular land use. On some soils included in the list, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Some soils that have a seasonal high water table and all soils that are frequently flooded during the growing season qualify as prime farmland only in areas where these limitations have been overcome by drainage measures or flood control. The need for these measures is indicated after the map unit name below. Onsite evaluation is needed to determine whether or not these limitations have been overcome by corrective measures.

The soils identified as prime farmland in Dade County are:

- 40000 Barden silt loam, 1 to 3 percent slopes
- 40003 Woodson silt loam, 1 to 3 percent slopes
- 40004 Barden loam, 2 to 5 percent slopes
- 40006 Barco-Sylvania complex, 2 to 5 percent slopes
- 40008 Parsons silt loam, 0 to 2 percent slopes
- 44000 Cherokee silt loam, 0 to 1 percent slope
- 46001 Verdigris silt loam, 0 to 1 percent slope, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
- 46002 Hepler silt loam, 0 to 1 percent slope, occasionally flooded
- 66001 Dameron silt loam, 0 to 3 percent slopes, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
- 70006 Crelton silt loam, 1 to 3 percent slopes

- | | | | |
|-------|--|-------|--|
| 70047 | Wanda silt loam, 2 to 5 percent slopes | 75378 | Sturkie silt loam, 0 to 2 percent slopes, frequently |
| 73031 | Gerald silt loam, 0 to 2 percent slopes | | flooded (where protected from flooding or not |
| 73059 | Pomme silt loam, 1 to 3 percent slopes | | frequently flooded during the growing season) |
| 74641 | Secesh silt loam, 0 to 2 percent slopes,
occasionally flooded | | |

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Interpretive Ratings

The interpretive tables in this survey rate the soils in the survey area for various uses. Many of the tables identify the limitations that affect specified uses and

indicate the severity of those limitations. The ratings in these tables are both verbal and numerical.

Rating Class Terms

Rating classes are expressed in the tables in terms that indicate the extent to which the soils are limited or not limited by all of the soil features that affect a specified use. Terms for the limitation classes are *not limited*, *slightly limited*, *moderately limited*, *limited*, and *very limited*.

Numerical Ratings

Numerical ratings in the tables indicate the severity of individual limitations. They also indicate the overall degree to which a soil is limited or not limited for a specific use. The numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation.

In tables that use limitation class terms, such as *very limited* or *limited*, *etc.*, limitation ratings, and numerical ratings are shown for each soil feature listed. As many as three soil features may be listed for each soil component if applicable. The overall limitation rating for the soil component is based on the most severe limitation.

Crops and Pasture

Todd E. Mason, district conservationist, Natural Resources Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly

grown in the survey area, are identified; the system of land capability classification used by the Natural Resources Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

In 1990, approximately 262,000 acres in Dade County was used for cropland, hayland, and pastureland. Of this total, about 168,000 acres is used for permanent pasture, hay, and fescue seed production; and 60,000 acres is used for cultivated crops, mainly soybeans, corn, grain sorghum, and wheat. Also, some rye, barley, oats, sunflowers, cucumbers, and various types of melons are grown each year. Most of the remainder of the acreage in Dade County, which amounts to about 57,300 acres, is federal land, urban land, water areas, and roads.

The potential of the soils in Dade County for sustained production of food is good. About 26 percent of the county is prime farmland. An additional 6 percent can be considered prime farmland where drained or protected against flooding. Cropland is mainly on uplands that are farmed in a manner that can cause excessive erosion, which prevents sustained production over a long period. Some of the marginal cropland used for row crops should be converted to pasture or hayland, or used in rotation with grasses and legumes.

Water erosion is the major problem on nearly all of the sloping cropland and overgrazed pasture in Dade County. All soils having slopes in excess of 2 percent are susceptible to erosion damage. Even soils such as Parsons, which have long slopes of 2 percent or less, will erode severely during intense spring rains if tillage is excessive and crop residue is removed.

Loss of the surface layer through erosion is damaging for two reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils that have a clayey subsoil, such as Barden and Sylvania soils. Erosion also reduces the productivity of soils that tend to be droughty because they contain a fragipan or are shallow over bedrock. Examples are Crelton and Moko soils. Second, soil erosion on farmland soils results in sedimentation in streams, lakes, and ponds. Control of erosion minimizes this pollution and improves the quality of water for municipal use, recreation, and for fish and wildlife. Erosion-control practices also prolong

the use of lakes and ponds by preventing them from filling with sediment and reduce the cost of cleaning road ditches.

The benefits of erosion-control practices to the survey area are vast. Practices that provide the most benefits are conservation tillage, which involves crop residue management, and cropping sequences that include small grains and meadow. Erosion-control practices reduce runoff, increase water infiltration, and improve soil tilth and soil productivity. A cropping system that keeps a vegetative or crop residue cover on the soil surface can hold soil losses to a level that will not reduce the long-term productivity of the soil. Growing grasses and legumes for pasture and hay is very effective in controlling erosion, especially when used in crop rotations. Legumes, such as clover and alfalfa, also provide nitrogen for the following crop.

Cropland soils generally are well suited for gradient broad-base terrace construction. This reduces the length of slope, which is the most limiting factor for erosion control on the Cherokee Prairie. By reducing the length of slope, overland flow velocity and quantity are reduced during peak runoff periods. Conventional terraces are most practical on uneroded upland soils with slopes of less than 8 percent. However, special management techniques may be needed on soils such as Barden and Crelton if terracing exposes the clayey subsoil.

Contour stripcropping and some form of conservation tillage are alternatives to terracing. Contour stripcropping is an effective slope length reducer. By alternating strips of row crops with small grain or hay strips, the water is slowed down and filtered through the grass buffer. The strips of grasses or grasses and legumes are usually used for hay. The areas between the strips are cultivated and planted to row crops, which are grown on the contour. Conservation tillage is another effective method of controlling erosion on sloping land. This use of crop residue to control erosion is becoming more common in the county, and it can be used on many of the soils. No-till systems are also being used more in the county, as no-till reduces surface disturbance and the hazard of erosion.

Soil tilth is affected by the texture and organic matter content of the surface layer. Most of the uneroded upland soils used for crops in the survey area have a silt loam surface layer and are medium to low in organic matter. Generally, the structure of the silt loam soils is weakened from tillage, which causes compaction. Under these conditions, intense rainfall causes the formation of crust on the surface. This crust is hard when dry and reduces water infiltration, hinders seed germination, and increases runoff. Crop residue

management, including no-till farming, is effective in improving organic matter, tilth, and soil structure.

Soil fertility is naturally lower in most of the eroded or lighter colored surface layer soils. On all soils, however, additional plant nutrients are needed before maximum production can be achieved. Most of the soils in the county are naturally acid in the upper part of the root zone. As a result, applications of ground limestone or ground dolomite are needed to raise the pH, calcium, and magnesium levels sufficiently for optimum growth of legumes. Additions of lime and fertilizer should be based on the results of current soil tests, on the needs of the crop, and on the desired yield level. The Cooperative Extension Service and some private farm service firms can help in determining the kinds and amounts of fertilizer and lime to be applied.

Soil drainage and flood control are management

concerns on about 6 percent of the acreage used for crops and pasture in the county. Woodson soils are naturally so wet that crop production is reduced during some parts of the year. Flooding can prevent crop production on Dameron, Hepler, and Sturkie soils. The flooding on these soils commonly occurs during the period November through May.

Pasture and hayland forages suited to the soils and climate in Dade County include legumes, cool-season grasses, and warm-season grasses. Alfalfa and red clover are the most common legumes grown for hay. Deep, well drained soils with a high available water capacity and a high content of calcium, magnesium, and potassium, such as Pomme and Wanda soils, are well suited to alfalfa for long-term hay or silage (fig. 10). Most alfalfa stand losses are caused by failure to maintain adequate levels of calcium and potassium in



Figure 10.—An area of Pomme soils (foreground) and an area of Goss soils (background) used for hay production.

the soil. Soils with a fragipan, such as Hoberg and Viraton; soils with a limited depth to bedrock, such as Bolivar and Sonsac; or soils with a seasonal wetness, such as Barden and Cliquot, are better suited to clover for hay or pasture. If proper lime and fertility levels are maintained, most soils in the county will support red, ladino, and other clovers. Most soils are suited to tall fescue, orchardgrass, and other cool-season grasses. These grasses grow best in the spring, early summer, and fall. Where additional midsummer pasture or hay is needed, warm-season grasses and legumes can be grown.

Warm-season grasses, such as big bluestem, indiangrass, switchgrass, Caucasian bluestem, and eastern gamagrass, are suited to a wide range of soil conditions. These grasses grow best from late spring to early fall and, thus, fill the "summer slump" period, left by the cool-season grasses, with green actively growing forage. Both cool- and warm-season grasses require proper management in order to produce at their highest potential.

Hayland management varies with each forage type, but some general rules apply to all grasses and legumes. Fertility levels should be maintained based on forage type, production, and soil testing. Cutting heights, cutting intervals, and stage of growth when cut will vary by forage type. As forages become maturer, the quantity will increase but the quality will decrease. Hayland management decisions

should be made based on these considerations.

Proper pasture management eliminates overgrazing and maintains a healthy stand of forages. By dividing pastures into smaller units and rotating livestock, forages are allowed to rest and recover from grazing pressure. Smaller pastures will also reduce selective or "spot grazing," which will allow legumes the opportunity to maintain themselves in the grass stand. The Natural Resources Conservation Service and the Cooperative Extension Service have information available on both hayland and pasture management based on forage type.

Specialty crops commercially grown in the county are cucumbers, popcorn, sunflowers, and small areas of apples and strawberries. Special equipment, management, and propagation techniques are needed where these crops are grown. Most of the soils that are used for specialty crops require supplemental irrigation at some time during the growing season. Onsite investigations and feasibility information are needed for most specialty crops.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management

are shown in tables 5 and 6. In any given year, yields may be higher or lower than those indicated in the tables because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in the tables are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

The land capability classification of map units in the survey area are shown in table 5. Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit.

Capability classes, the broadest groups, are

designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have slight limitations that restrict their use.

Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.

Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, 2e. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, forestland, wildlife habitat, or recreation.

Pasture and Hayland Suitability Groups

The soils in Dade County are assigned to a pasture and hayland group according to their suitability for pasture management.

Many different pasture and hayland suitability groups

are in the survey area. Over time, the combination of plants best suited to a particular soil and climate has or will become dominant. Plant communities are not static but vary slightly from year to year and place to place.

The relationship between soils and vegetation was ascertained during this survey. Thus, pasture and hayland suitability groups generally can be determined directly from the soil map. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the productivity of each plant species. Soil reaction, salt content, and a seasonal high water table are also important. The "Field Office Technical Guide," which is available at local offices of the Natural Resources Conservation Service, can provide specific information about pasture and hayland suitability groups.

Table 6 shows, for each soil, the assigned pasture and hayland suitability group. Specific concerns and recommendations for pasture and hayland management for each group are discussed below.

Group WCU—Wet Clayey Upland. Wetness is the main management concern. Maintaining stands of desirable species is difficult in depressional areas. A drainage system can improve the growth of deep-rooted species.

Group WLO—Wet Loamy Overflow. Wetness and flooding are the main management problems. A seedbed can be easily prepared. A drainage system can improve the growth of deep-rooted species. The hazard of flooding should be considered when a grazing system is designed.

Group LyO—Loamy Overflow. Flooding is the main management problem. The hazard of flooding should be considered when a grazing system is designed.

Group LyU—Loamy Upland. No serious problems affect pasture and hayland management. Erosion is a hazard in newly seeded areas. Timely seedbed preparation is needed to ensure a good ground cover.

Group CyU—Clayey Upland. Pasture and hay crops are effective in controlling erosion. Erosion during seedbed preparation is the main problem. Timely tillage and a quickly established ground cover reduce the hazard of erosion. The forage species that are tolerant of wetness grow best. The production of deep-rooted legumes is limited because of wetness and a restricted rooting depth.

Group GrU—Gravelly Upland. The soils in this group generally are not suited to cultivated crops. Droughtiness and erosion are the main management problems. Seedbeds should be prepared on the contour. Timely seedbed preparation helps to ensure rapid plant growth and a protective ground cover.

Group MDU—Moderately Deep Upland. Shallow-

rooted species that are tolerant of droughtiness should be selected for planting. Erosion is a serious hazard in newly seeded areas. Timely tillage and a quickly established ground cover reduce the hazard of erosion.

Group WtP—Wet Pan. The species that are tolerant of wetness grow best. A dense layer in the subsoil can restrict the rooting depth and result in insufficient soil moisture in dry years. Erosion during seedbed preparation is the main problem. Timely tillage and a quickly established ground cover reduce the hazard of erosion.

Group LyP—Loamy Pan. A few small areas of this group are used for cultivated crops, and some areas are wooded. A dense layer in the subsoil can restrict the rooting depth and result in insufficient soil moisture in dry years. Erosion during seedbed preparation is a hazard. Seedbeds should be prepared on the contour. Timely tillage and a quickly established ground cover reduce the hazard of erosion.

Group GrP—Gravelly Pan. If the soils in this group are used for improved pasture, chert on the surface hinders tillage. Because of seasonal droughtiness, timely planting is needed to ensure an adequate stand. Erosion is a hazard in newly seeded areas. Timely seedbed preparation helps to ensure a protective ground cover.

Group ShU—Shallow Upland. Most areas of this group are used for native pasture and are best suited to shallow-rooted species. In some areas tillage is nearly impossible. Broadcast seeding may be necessary. The slope and rock outcrop can hinder mowing in places.

Group GNS—Generally Not Suited. The soils in this group generally are not suited to pasture and hay. The suitability for forage species and the use of equipment are limited by the slope, by a high content of rock fragments, or by both of these.

Woodland Management and Productivity

Douglas C. Wallace, forester, Natural Resources Conservation Service, helped prepare this section.

Approximately 17 percent (55,032 acres) of Dade County is forested, according to 1986 Missouri Department of Conservation woodland survey estimates (Geissman and others, 1986). Woodland tracts in the county are primarily small to medium, private holdings of less than 300 acres and are essentially unmanaged, pole timber-sized, and smaller stands (Ostrom, 1991). In the flood plains, forests are restricted to long, narrow bands bordering streams and rivers. Tree

species and growth rates in the county vary, depending on site conditions, soil types, and past management.

The soil serves as a reservoir for moisture, provides an anchor for roots, and supplies essential plant nutrients. Soil properties that affect the growth of trees include reaction (pH), fertility, drainage, texture, structure, and soil depth. Soils in which these properties are not extreme and have effective rooting depth greater than 40 inches provide the best medium for tree growth.

Other site characteristics that affect tree growth include aspect and topographic position. These site characteristics influence the amount of available sunlight, air drainage, soil temperature, soil moisture, and relative humidity. Generally, north and east aspects and lower slope positions, which are cooler and have better moisture conditions, are the best upland sites for tree growth.

Management activities can influence woodland productivity and should be aimed at eliminating factors causing tree stress. Generally, this involves thinning overstocked young stands; harvesting old, mature trees; and eliminating destructive fire and grazing. Fire and grazing have very negative impacts on forest growth and quality. While forest fires are no longer a major problem in the county, about 70 percent of the woodland is still subject to grazing. Grazing destroys the leaf layer on the surface, compacts the soil, and eliminates or damages tree seedlings. Woodland sites that are ungrazed and unburned have the highest potential for optimum timber production and tree growth.

Alsip, Bolivar, Goss, and Sonsac soils are predominant on forested upland positions in Dade County. Post oak, blackjack oak, and black oak forest types are typical on these soils. Other significant forest types include white oak and eastern redcedar mixed hardwood (Ostrom, 1991).

Along the major watercourses, Dameron, Secesh, and Sturkie soils support bottomland hardwoods adapted to flooding soil conditions. Many of these sites have been cleared for pasture and crop production. The uncleared wooded areas typically contain silver maple, hackberry, American elm, sycamore, cottonwood, and Shumard oak. Bur oak, green ash, and walnut are common along the smaller stream bottoms and higher terraces of the major streams. A high potential for excellent forest growth exists on these sites.

Uplands soils, such as Cherokee, Crelton, and Parsons, formed under prairie grasses or transitional open forest vegetation with prairie understory. Successful establishment of woodland trees on these soils may require extra care and maintenance.

Specialty tree plantings, such as Christmas trees, nut trees, and fuelwood trees, can be very successful if adapted tree species are used.

Christmas tree plantings can be established on any soil that is not poorly drained or very poorly drained. Species of trees best suited to the soils in Dade County are scotch, Virginia, red, and white pines. Nut trees, such as black walnut and pecan, are best suited to deep, medium textured, moderately well drained to well drained soils, such as Dameron and Sturkie. Other soils are also suited but may be less productive.

Tree plantations for fuelwood utilizing fast-growing trees have potential for use in Dade County. The species most adaptable for this purpose include green ash, black locust, sycamore, and silver maple.

Forest Productivity and Management

The tables in this section can help forest owners or managers plan the use of soils for wood crops. Potential productivity of the soils for wood crops is provided in table 7. Interpretative ratings are provided for various aspects of forest management in tables 8a and 8b.

Forest Productivity

In table 7, the *potential productivity* of merchantable or *common trees* on a soil is expressed as a site index and as a volume number. The *site index* is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that forest managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability. More detailed information regarding site index is available in the "National Forestry Manual," which is available in local offices of the Natural Resources Conservation Service or in electronic form (<http://nssc.nssc.nrcs.usda.gov/nfm/>).

The *volume of wood fiber*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic feet per acre per year and calculated at the age of culmination of the mean annual increment (CMAI), indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

Trees to manage are those that are preferred for planting, seeding, or natural regeneration and those that remain in the stand after thinning or partial harvest.

Forestland Management

In tables 8a and 8b, interpretative ratings are given for various aspects of forest management. The ratings in the tables are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified aspect of forest management. *Not limited* indicates that the soil has features that are very favorable for the specified aspect of management. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified aspect of management. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Moderately limited* indicates that the soil has features that are moderately favorable for the specified aspect of management. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Limited* indicates that the soil has one or more features that are significant limitations for the specified aspect of management. The limitations can be overcome, but generally require special design, special planning, soil reclamation, specialized equipment, or other procedures that may result in additional expense. Fair performance and moderate to high maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified aspect of management. The limitations generally cannot be overcome without major soil reclamation, special design, specialized equipment, or other expensive procedures. Poor performance, unsafe conditions, or high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation.

Limitation class terms, such as *very limited* or *limited*, etc., and numerical ratings are shown for each soil feature listed. As many as three soil features may be listed for each soil component if applicable. The

overall limitation class for the soil component is based on the most severe limitation.

The paragraphs that follow indicate the soil properties considered in rating the soils for forest management factors. More detailed information about the criteria used in the ratings is available in the "National Forestry Manual," which is available in local offices of the Natural Resources Conservation Service or in electronic form (<http://nssc.nssc.nrcs.usda.gov/nfm/>).

Ratings in the column *hand planting suitability* are based on slope, depth to a restrictive layer, content of sand, plasticity index, rock fragments on or below the surface, a water table, and ponding. Ratings indicate the expected difficulty of hand planting, which includes the proper placement of root systems of tree seedlings to a depth of up to 12 inches, using standard hand planting tools. It is assumed that necessary site preparation is completed before seedlings are planted.

Ratings in the column *mechanical planting suitability* are based on slope, depth to a restrictive layer, content of sand, plasticity index, rock fragments on or below the surface, a water table, and ponding. Ratings indicate the expected difficulty using a mechanical planter, which includes proper placement of root systems of tree seedlings to a depth up to 12 inches. It is assumed that necessary site preparation is completed before seedlings are planted.

Ratings in the column *harvest equipment operability* are based on slope, rock fragments on the surface, plasticity index, content of sand, surface texture, a water table, and ponding. Ratings indicate the suitability for operating harvest equipment for off-road transport or harvest of logs and/or wood products by ground-based wheeled or tracked equipment.

Ratings in the column *mechanical site preparation (surface)* are based on slope, depth to a restrictive layer, plasticity index, rock fragments on or below the surface, a water table, and ponding. The part of the soil from the surface to a depth of about 12 inches is considered in the ratings. Ratings indicate the suitability of using surface-altering soil tillage equipment to prepare the site for planting or seeding.

Ratings in the column *road suitability (natural surface)* are based on slope, rock fragments on the surface, plasticity index, content of sand, surface texture, a water table, ponding, flooding, and the hazard of soil slippage. The ratings indicate the suitability for using the natural surface of the soil for roads on which trucks transport logs and other wood products from the site.

Ratings in the column *potential erosion hazard (road/trail)* are based on the soil erodibility factor K,

slope, and content of rock fragments. The ratings apply to unsurfaced roads and trails.

Ratings in the column *potential erosion hazard (off-road/off-trail)* are based on slope and on soil erodibility factor K. The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 75 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance.

Ratings in the column *soil rutting hazard* are based on a water table, rock fragments on or below the surface, surface texture, depth to a restrictive layer, and slope. Ratings indicate the hazard or risk of ruts in the uppermost soil surface layers by operation of forest equipment. Soil displacement and puddling (soil deformation and compaction) may occur simultaneously with rutting.

Ratings in the column *log landing suitability* are based on slope, rock fragments on the surface, plasticity index, content of sand, surface texture, a water table, ponding, flooding, and the hazard of soil slippage. Ratings indicate the suitability of the soil at the forest site to serve as a log landing and allows the efficient and effective use of equipment for the temporary storage and handling of logs.

Ratings in the column *potential seedling mortality* are based on flooding, ponding, a water table, content of lime, reaction, salinity, available water capacity, soil moisture regime, soil temperature regime, aspect, and slope. Ratings indicate the impact of soil, physiographic, and climatic conditions on the survivability of newly established tree seedlings.

Windbreaks and Environmental Plantings

Douglas C. Wallace, forester, Natural Resources Conservation Service, helped prepare this section.

Living plants play an important role in supporting our life and improving its condition. When properly used and maintained, plants help to provide positive solutions to many problems existing in our contemporary environment. In Dade County, windbreaks and environmental plantings can be utilized throughout the landscape for a variety of engineering, climatological, and aesthetic needs.

Windbreaks can be grown successively in most areas of Dade County. Some important considerations for managing farmstead and field windbreaks are design and layout; species selection; site preparation; seedling handling; weed management; irrigation; and protection from diseases, insects, and livestock.

Farmstead windbreaks make the farmstead area a more comfortable place to live and work, reduce

energy costs, increase yields from garden and fruit trees, enhance wildlife populations, buffer noises, and raise property values (Scholten, 1998).

Feedlot windbreaks can be used to protect livestock from wind and snow. Windbreaks significantly reduce calf losses, make feeding operations easier, and enable livestock to maintain optimum weight with less feed.

Farmstead and feedlot windbreaks are generally three or more rows deep and include at least two rows of coniferous trees. The windbreaks should be located on the windward side of the area to be protected and should be at right angles to the prevailing winds. Well-designed farmstead and feedlot windbreaks are needed throughout Dade County, especially in the former open prairie areas of the Barden-Parsons and Sylvania-Barden-Barco soil associations.

Field windbreaks or shelterbelts are designed to protect field crops and bare soil from the effects of strong winds. Field windbreaks reduce soil losses, increase crop yields, help to prevent the spread of weeds between fields, and enhance wildlife populations (Brandle, Hintz, and Sturrock, 1988). Careful planning is needed. Field boundaries, irrigation systems, power lines and roads should be considered in determining the location of field windbreaks. Windbreaks should be oriented at right angles to prevailing winds. The typical field windbreak system consists of a series of single rows of trees or shrubs. As with farmstead windbreaks, field windbreaks are adaptable to many locations throughout Dade County but are most beneficial in the Barden-Parsons and Sylvania-Barden-Barco soil associations.

Environmental plantings can be used for beautification, as visual screens, and for control of acoustical, pollution, and climatological problems around buildings and other living spaces. Plants whose height, shape, form, color, and texture are compatible with the surrounding area, structures, and desired use should be selected (Robinette, 1972). Trees and shrubs can be easily established on most sites and soil types in Dade County if there is adequate site preparation prior to planting and weeds and other competition are controlled after planting.

Table 9 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in the table are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from the local office of the Natural Resources Conservation Service or of the Cooperative Extension Service or from a commercial nursery.

Recreational Development

The diversity of the landscapes and vegetation cover from rolling grassland hills to prairies to forest-covered stream valleys provide Dade County with many recreational opportunities.

The Stockton Lake project consists of 17,836 acres of federal land and 9,364 acres of water surface. The project area provides most of the recreational opportunities in the county, including access to boating and other water sports, camping, hiking, hunting, and nature studies. The Corps of Engineers and the Missouri Department of Conservation manage 90 percent of the project land for wildlife enhancement. The Missouri Department of Conservation also manages several tracts in other parts of the county that provide a wide diversity of landscapes and vegetation for most outdoor activities. These tracts include native prairie areas and river access points.

Recreation facilities in most urban areas of the county include sporting arenas and city parks.

The soils of the survey area are rated in table 10 according to limitations that affect their suitability for recreational use. Soils are rated for camp areas, picnic areas, playgrounds, and paths and trails.

The ratings in the table are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect recreation site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Moderately limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be

overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Limited* indicates that the soil has one or more features that are significant limitations for the specified use. The limitations can be overcome, but generally require special design, soil reclamation, or installation procedures that may result in additional expense. Fair performance and moderate to high maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation.

Limitation class terms, such as *very limited* or *limited, etc.*, limitation ratings, and numerical ratings are shown for each soil feature listed. As many as three soil features may be listed for each soil component if applicable. The overall limitation rating for the soil component is based on the most severe limitation.

The information in table 10 can be supplemented by other information in this survey, for example, interpretations for building site development, construction materials, sanitary facilities, and water management.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The soil properties that affect the performance of the areas after development are those that influence trafficability and promote the growth of vegetation, especially in heavily used areas. For good trafficability, the surface of camp areas should absorb rainfall

readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The ratings are based on the soil properties that affect the ease of developing picnic areas and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of picnic areas. For good trafficability, the surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Playgrounds require soils that are nearly level, are free of stones, and can withstand intensive foot traffic. The ratings are based on the soil properties that affect the ease of developing playgrounds and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of playgrounds. For good trafficability, the surface of the playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The ratings are based on the soil properties that affect trafficability and erodibility. These properties are stoniness, a water table, ponding, flooding, slope, and texture of the surface layer. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to frequent flooding during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

The information in the table can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 13 and interpretations for dwellings without basements and for local roads and streets in table 12.

Wildlife Habitat

Bob Schroepel, wildlife biologist, Missouri Department of Conservation, helped prepare this section.

Dade County is located in the southwestern portion of the state, where the prairies of the west begin to grade into woodlands of the Ozarks. Early records indicate that the county included nearly 247 square miles, or 49 percent of the county's land base, in presettlement tall grass prairie. This huge expanse of native grassland remained relatively unsettled with early settlers placing more value on wooded land than the prairies. Early accounts had the prairie described as a "vast wasteland of bluestem grass growing as high as the back of a horse" (Abbott and Hoff, 1971).

Two major factors contributed to the demise of the presettlement prairie—the advent of the railroad and the control of wildfire. With increased access to remote parts of the county and a method of shipment for crops, the railroad led to fencing of the grasslands for pasture and plowing for cropland (Bicknese, 1989). Prairies in the western part of the county became more attractive for settlement, and by 1900, 89 percent of the land was reported as being farmland (Watson, 1909). In the early 1800's, settlers began to control wildfires, probably for safety reasons. This allowed woody species to expand from the wooded stream valleys into the prairies. This process of timber invasion was described in the following account from neighboring Lawrence County:

"As the prairie lands were fenced and prairie fires were checked, the forests began to encroach on the prairies. Growth of hazel and sumac skirted the edges of the prairie, and here and there a lone hickory, a small clump of post oak, or a persimmon advanced onto the prairie, in many places following the courses of small streams. These trees were in time surrounded by others, forming larger clumps which spread until extensive areas became forested" (Sweet and Jordon, 1928).

Dade County falls within two natural divisions of Missouri as defined by Thom and Wilson (1980). The western one third falls within the Osage Plains Natural Division. This section was primarily prairie in presettlement time, but savanna, upland and bottomland deciduous forest, and marsh also occurred. Streams in this division commonly have shallow valleys and broad flood plains with sloughs and marshes. Pin oak and pecan are typical trees of the bottomland deciduous forest (Thom and Wilson, 1980). Soils in the area are nearly level to gently sloping, and geological formations of the Osage Plains are primarily Pennsylvanian age sandstone and Meramecian series limestone of Mississippian age (Koeing, 1961). The rest

of the county falls within the Springfield Plateau Section of the Ozark Natural Division. This section is less highly dissected than the other sections of the Ozarks. It is characterized by a higher elevation, numerous karst features, Ozark border soils, and Mississippian and Ordovician bedrock (Ostrom, 1991). Glades, prairies, savannas, and deciduous forests characterized this region in presettlement time. The geology of the Springfield Plateau Division is mostly Osagean series limestone of Mississippian age (Koeing, 1961).

A major portion of the nearly 16,000 acres of federal public land surrounding Stockton Lake falls within Dade County's borders. In addition to managing this federal land around the lake, the Missouri Department of Conservation manages numerous state-owned areas in Dade County. Some of these include the 640-acre Stoney Point Prairie Conservation Area, 320-acre Niawathe Prairie Conservation Area, 320-acre Sloan (Dr. O. E. & Eloise) Conservation Area, 40-acre Indigo Prairie Conservation Area, and 50-acre Fiddlers Ford Access along Turnback Creek east of South Greenfield.

In 1989, the Missouri Department of Conservation identified high-quality natural communities in Dade County. Over 50 prairies qualified, and even though prairies were the most common natural features found in the inventory, prairies continue to be destroyed every year. Burn's Section Prairie (private) and the adjacent Stoney Point Prairie form a 1,280-acre prairie complex, one of the largest prairie units remaining in the state (Bicknese, 1989).

The transitional land use found in this area between the western prairie and eastern woodlands of the Ozarks created a region rich with wildlife diversity. Elk, wolves, bison, geese, turkey, mountain lions, bears, prairie chickens, ducks, and deer were common throughout the region. Early settlers in the area reduced the numbers of many of these animals through overharvest, either for a food source, to protect crops, or for personal protection (Bicknese, 1989).

There are published and/or documented accounts of 109 fish and wildlife species known to occur in Dade County, with another 102 species listed as "likely to occur," according to the Missouri Department of Conservation in 1987. Typical nongame species include golden shiner, northern crawfish frog, prairie ringneck snake, turkey vulture, yellow-billed cuckoo, eastern bluebird, prairie vole, and southern flying squirrel. The most common game species include white-tailed deer, wild turkey, northern bobwhite quail, eastern cottontail rabbit, white crappie, bass, and walleye.

The abundance of larger Missouri mammals in Dade County is similar to that found in other western Ozark border counties. Sightings compiled from the Missouri Department of Conservation cooperative archery hunter

survey show that Dade County has a slightly lower occurrence of red fox, bobcat, and deer, but higher numbers of gray fox, coyote, raccoon, and opossum when compared to the state average. This survey is based on sightings per 1,000 hours of hunter trips (Missouri Department of Conservation, 1990, Study No. 68). Furbearer harvest for Dade County was lower in 1988-89 than neighboring counties. Those species harvested included opossum, muskrat, raccoon, mink, red fox, gray fox, coyote, bobcat, and beaver (Missouri Department of Conservation, 1990, Study No. 10).

Wildlife species associated with prairie habitat are usually unique to prairies and not found in any other habitat type in the state. The plight of the greater-prairie chicken has been well documented, and populations have continued to decline since the late 1950's. Destruction and degradation of native prairies, either through plowing or mismanagement, are the primary reasons. Today, nearly 93 percent of the original prairie in Missouri is gone. However, Dade County might have the best private land population of prairie chickens in the state. This fact alone should encourage county landowners to practice wise management of their native grasslands. In addition, there are several other species, such as Henslow's sparrows, short-eared owls, upland sandpipers, northern crawfish frogs, prairie mole crickets, northern harriers, and scissor-tailed flycatchers, that are also dependent on the habitat provided by Dade County prairies.

Several fish and wildlife species found in Dade County maintain special status in regard to state and federal rare and/or endangered species. A few of the documented species include the Ozark cavefish, common barn owl, double-crested cormorant, bald eagle, osprey, and least weasel. Other species identified in the Natural Features Inventory of 1989 included the Regal fritillary butterfly, greater prairie chicken, blacknose shiner, prairie mole cricket, Arkansas darter, black-tailed jackrabbit, bristly cave crayfish, gray bat, northern harrier, and northern crawfish frog (Bicknese, 1989).

Openland wildlife species, such as bobwhite quail and rabbits, suffer from lack of hard winter cover, poor grassland management, and limited winter foods. The shortage of small grains in the county (18 percent of the total acres are in cropland) limits the winter food supply for many birds and animals. The use of food plots or leaving a few rows of unharvested crops in the fields could help with this problem. The cropland found in the county are usually on the Barco, Barden, Crelton, Hoberg, Parsons, and Wanda soils. Nearly 69 percent of the county's land area is in grassland, with tall fescue as the dominant grass. Much of this conversion to tall

fescue resulted from the chemical spraying of timber and the plowing of native prairies. This limits small game numbers because of tall fescue's growth characteristics and common management practices (i.e., early haying and overgrazing). Increasing the acreage and improving the management of native warm-season grasses help to improve the quality and diversity of the county's grasslands for wildlife. In addition, the use of planned grazing systems protects critical areas needed for nesting and escape cover.

Dade County has around 14 to 17 percent of its land area in forestland, which includes approximately 323,000 acres. Typically, the major woodlands are found on the Alsup, Basehor, Goss, Sonsac, and Wilderness soils. The primary game species found here are white-tailed deer, with local and non-county hunter pressure considered fair. There are several factors that affect the quality of the woodland habitat in Dade County. All woodland species suffer greatly from misuse of the timber resource, most notably the grazing of timber. Grazing of woodlands can lead to tree damage, destruction of wildlife habitat, increased soil erosion, and soil compaction. Wildlife species that suffer from woodland grazing include everything from the three-toed box turtle to the American woodcock to the great horned owl.

Aside from Stockton Lake, a U.S. Corps of Engineers reservoir, wetland habitat in Dade County is very limited. Wetland habitat types occur on or along Stockton Lake; Sac River; Muddy Fork of Spring River; and Sons, Turnback, Limestone, Horse, Maze, and Cedar Creeks.

Several waterfowl species, such as Canada goose, northern pintail, wood duck, and mallard, are residents of the county. Although migratory, the number of snow geese present during the winter months provides a growing hunting opportunity. Dameron, Hepler, and Secesh soils are the predominant soils found along the smaller creek bottoms, while Hepler and Sturkie soils are associated with the larger Sac River bottoms. Three active heron rookeries can be found along these major river and creek bottoms. The largest is along Sons Creek, with 110 individual birds and 81 active nests recorded in 1988. The primary sport-fishing species in the county include largemouth bass, white and black crappie, and walleye.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing

plant cover, or by promoting the natural establishment of desirable plants.

In tables 11a and 11b, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. *Not limited* indicates that the soil has features that are very favorable for the specified use. Habitat is easily established, improved, or maintained. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Habitat can be established, improved, or maintained. *Moderately limited* indicates that the soil has features that are moderately favorable for the specified use. Habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. *Limited* indicates that the soil has one or more features that are significant limitations for the specified use. Habitat is difficult to create, improve, or maintain in most places. Management is difficult and must be very intensive. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. Habitat is usually impractical or impossible to create, improve, or maintain. Management would be very difficult and unsatisfactory results can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00.

Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation.

Limitation class terms, such as *very limited* or *limited*, etc., and numerical ratings are shown for each soil feature listed. As many as three soil features may be listed for each soil component if applicable. The

overall limitation class for the soil component is based on the most severe limitation.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Selection should be made from a list of locally adapted species.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Selection should be made from a list of locally adapted species.

Upland wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Selection should be made from a list of locally adapted species.

Upland shrubs and vines are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs and vines are depth of the root zone, available water capacity, salinity, and soil moisture. Selection should be made from a list of locally adapted species.

Upland deciduous trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees are depth of the root zone, available water capacity, and wetness. Selection should be made from a list of locally adapted species.

Upland mixed deciduous-conifer trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, browse, seeds and foliage. Soil properties and features that affect the growth of these trees are depth of the root zone, available water capacity, and wetness. Selection should be made from a list of locally adapted species.

Riparian herbaceous plants are annual and perennial native or naturally established grasses and forbs that grow on moist or wet sites. Soil properties and features affecting riparian herbaceous plants are surface texture, wetness, flooding, ponding, and surface stones. Selection should be made from a list of locally adapted species.

Riparian shrubs, vines, and trees are bushy woody plants and trees that grow on moist or wet sites. Soil properties and features affecting these plants are surface texture, wetness, flooding, ponding, and surface stones. Selection should be made from a list of locally adapted species.

Freshwater wetland plants are grasses, forbs, and shrubs that are adapted to wet soil conditions. The soils suitable for this habitat generally occur adjacent to springs, seeps, depressions, bottomlands, marshes, or backwater areas of flood plains. Most areas are ponded for some period of time during the year. Soil properties and features affecting these plants are surface texture, wetness, ponding, and soil reaction. Selection should be made from a list of locally adapted species.

Irrigated freshwater wetland plants are grasses, forbs, and shrubs that are adapted to wet soil conditions. The soils suitable for this habitat generally occur in areas of cropland, previously cropped areas, and marginal areas associated with cropland and wetlands. These areas may be ponded for some period of time during the year. These areas are generally suitable for restoring wetland features temporarily or permanently. Soil properties and features affecting these plants are surface texture, permeability, wetness, ponding, and soil reaction. Selection should be made from a list of locally adapted species.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, water management, and waste management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria

were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Table 12 shows the degree and kind of soil limitations that affect dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates

that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Moderately limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Limited* indicates that the soil has one or more features that are significant limitations for the specified use. The limitations can be overcome, but generally require special design, soil reclamation, or installation procedures that may result in additional expense. Fair performance and moderate to high maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation.

Limitation class terms, such as *very limited* or *limited, etc.*, limitation ratings, and numerical ratings are shown for each soil feature listed. As many as three soil features may be listed for each soil component if applicable. The overall limitation rating for the soil component is based on the most severe limitation.

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7

feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, a water table, and ponding.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after

vegetation is established. The properties that affect plant growth are reaction; a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

Sanitary Facilities

The soils of the survey area are rated in table 13 according to limitations that affect their suitability for sanitary facilities. Soils are rated for septic tank absorption fields, sewage lagoons, sanitary landfills, and daily cover for landfill.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect sanitary facilities. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Moderately limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Limited* indicates that the soil has one or more features that are significant limitations for the specified use. The limitations can be overcome, but generally require special design, soil reclamation, or installation procedures that may result in additional expense. Fair performance and moderate to high maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation.

Limitation class terms, such as *very limited* or *limited, etc.*, limitation ratings, and numerical ratings are shown for each soil feature listed. As many as three soil features may be listed for each soil component if applicable. The overall limitation rating for the soil component is based on the most severe limitation.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 60 inches is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Permeability, a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may be contaminated. Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, hillside seepage, and contamination of ground water, can affect public health.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, permeability, a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Soil permeability is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a permeability rate of more than 2 inches per hour are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can

result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overtops the lagoon.

A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor. If the lagoon is to be uniformly deep throughout, slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

A *trench sanitary landfill* is an area where solid waste is placed in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil excavated at the site. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. The ratings in the table are based on the soil properties that affect the risk of pollution, the ease of excavation, trafficability, and revegetation. These properties include permeability, depth to bedrock or a cemented pan, a water table, ponding, slope, flooding, texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, onsite investigation may be needed.

Hard, nonrippable bedrock, creviced bedrock, or highly permeable strata in or directly below the proposed trench bottom can affect the ease of excavation and the hazard of ground-water pollution. Slope affects construction of the trenches and the movement of surface water around the landfill. It also affects the construction and performance of roads in areas of the landfill.

Soil texture and consistence affect the ease with which the trench is dug and the ease with which the soil can be used as daily or final cover. They determine the workability of the soil when dry and when wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and are difficult to place as a uniformly thick cover over a layer of refuse.

The soil material used as the final cover for a trench landfill should be suitable for plants. It should not have excess sodium or salts and should not be too acid. The surface layer generally has the best workability, the highest content of organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

In an *area sanitary landfill*, solid waste is placed in successive layers on the surface of the soil. The waste

is spread, compacted, and covered daily with a thin layer of soil from a source away from the site. A final cover of soil material at least 2 feet thick is placed over the completed landfill. The ratings in the table are based on the soil properties that affect trafficability and the risk of pollution. These properties include flooding, permeability, a water table, ponding, slope, and depth to bedrock or a cemented pan.

Flooding is a serious problem because it can result in pollution in areas downstream from the landfill. If permeability is too rapid or if fractured bedrock, a fractured cemented pan, or the water table is close to the surface, the leachate can contaminate the water supply. Slope is a consideration because of the extra grading required to maintain roads in the steeper areas of the landfill. Also, leachate may flow along the surface of the soils in the steeper areas and cause difficult seepage problems.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste. The ratings in the table also apply to the final cover for a landfill. They are based on the soil properties that affect workability, the ease of digging, and the ease of moving and spreading the material over the refuse daily during wet and dry periods. These properties include soil texture, a water table, ponding, rock fragments, slope, depth to bedrock or a cemented pan, reaction, and content of salts, sodium, or lime.

Loamy or silty soils that are free of large stones and excess gravel are the best cover for a landfill. Clayey soils may be sticky and difficult to spread; sandy soils are subject to wind erosion.

Slope affects the ease of excavation and of moving the cover material. Also, it can influence runoff, erosion, and reclamation of the borrow area.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. It should not have excess sodium, salts, or lime and should not be too acid.

Construction Materials and Excavating

The soils of the survey area are rated in Table 14 as a source of roadfill, sand, gravel, or topsoil. Normal compaction, minor processing, and other standard construction practices are assumed. The soils are also rated according to limitations that affect their suitability for shallow excavations. The ratings in the table are both verbal and numerical.

The soils are rated as a *probable*, *possible* or

improbable source of sand and gravel. A rating of *probable* means that the source material is likely to be in or below the soil. A rating of *possible* means that the source material may be in or below the soil and further investigation is warranted. A rating of *improbable* means that the source material is unlikely to be in or below the soil. The numerical ratings in these columns indicate the degree of probability. A numerical rating of 1.00 indicates that the soil is an improbable source. A numerical rating of less than 1.00 indicates the degree to which the soil is a possible or probable source of sand or gravel.

Other rating class terms, as follows, are used to indicate the extent to which the soils are limited by soil features that affect use as a source for roadfill or topsoil or suitability for shallow excavations. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Moderately limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Limited* indicates that the soil has one or more features that are significant limitations for the specified use. The limitations can be overcome, but generally require special design, soil reclamation, or installation procedures that may result in additional expense. Fair performance and moderate to high maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations indicate gradations between the point at which a soil feature has the greatest negative

impact on the use and the point at which the soil feature is not a limitation.

Limitation class terms, such as *very limited* or *limited, etc.*, limitation ratings, and numerical ratings are shown for each soil feature listed. As many as three soil features may be listed for each soil component if applicable. The overall limitation rating for the soil component is based on the most severe limitation.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the whole soil, from the surface to a depth of about 5 feet. It is assumed that soil layers will be mixed when the soil material is excavated and spread.

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in place. The thickness of the suitable material is a major consideration. The ease of excavation is affected by large stones, a water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the AASHTO classification of the soil) and linear extensibility (shrink-swell potential).

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area. The ratings are based on the soil properties that affect plant growth; the ease of excavating, loading, and spreading the material; and reclamation of the borrow area. Toxic substances, soil reaction, and the properties that are inferred from soil texture, such as available water capacity and fertility, affect plant growth. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, depth to bedrock or a cemented pan, and toxic material.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In the table, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific

purposes is not evaluated, nor are factors that affect excavation of the material. The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the lowest layer of the soil contains sand or gravel, the soil is rated as a probable source regardless of thickness. The assumption is that the sand or gravel layer below the depth of observation exceeds the minimum thickness.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Water Management

The soils of the survey area are rated in table 15 according to limitations that affect their suitability for water management. Soils are rated for pond reservoir areas, drainage, irrigation, terraces and diversions, and grassed waterways. Restrictive features that affect each soil for the specified use is also provided in the table.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Moderately limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Limited* indicates that the soil has one or more features that are significant limitations for the specified use. The limitations can be overcome, but generally require special design, soil reclamation, or installation procedures that may result

in additional expense. Fair performance and moderate to high maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00.

Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation.

Limitation class terms, such as *very limited* or *limited*, etc., limitation ratings, and numerical ratings are shown for each soil feature listed. As many as three soil features may be listed for each soil component if applicable. The overall limitation rating for the soil component is based on the most severe limitation.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock, or other permeable material. Slope can affect the storage capacity of the reservoir area.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, permeability, depth to a water table, ponding, slope, and flooding. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or a cemented pan, large stones, slope, and the likelihood that cutbanks will cave. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. The availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to a water table, ponding, flooding, available water capacity, intake rate, permeability,

erodibility, and slope. The construction of a system is affected by large stones and depth to bedrock. The performance of a system is affected by the depth of the root zone, reaction, and the amount of salts, sodium, sulfur, lime, or gypsum.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, a water table, ponding, large stones, and depth to bedrock affect the construction of terraces and diversions. A restricted rooting depth, erodibility, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, a water table, slope, and depth to bedrock affect the construction of grassed waterways. Erodibility, soil moisture regime, available water capacity, restricted rooting depth, restricted permeability, and toxic substances, such as salts and sodium, affect the growth and maintenance of the grass after construction.

Waste Management

Soil properties are important considerations in areas where soils are used as sites for the treatment and disposal of organic waste and wastewater. Selection of soils with properties that favor waste management can help to prevent environmental damage.

Table 16 shows the degree and kind of soil limitations affecting the treatment of agricultural waste, including municipal and food-processing wastewater and effluent from lagoons or storage ponds. Municipal wastewater is the waste stream from a municipality. It contains domestic waste and may contain industrial waste. It may have received primary or secondary treatment. It is rarely untreated sewage. Food-processing wastewater results from the preparation of fruits, vegetables, milk, cheese, and meats for public consumption. In places it is high in content of sodium and chloride. In the context of this table, the effluent in lagoons and storage ponds is from facilities used to treat or store food-processing wastewater or domestic or animal waste. Domestic and food-processing wastewater is very dilute, and the effluent from the facilities that treat or store it commonly is very low in content of carbonaceous and nitrogenous material; the content of nitrogen commonly ranges from 10 to 30 mg/l. The wastewater from animal waste treatment lagoons or storage ponds, however, has much higher concentrations of these materials, mainly because the manure has not been diluted as much as the domestic waste. The content of nitrogen in this wastewater

generally ranges from 50 to 2,000 mg/l. When wastewater is applied, checks should be made to ensure that nitrogen, heavy metals, and salts are not added in excessive amounts.

The ratings in the table are for waste management systems that not only dispose of and treat organic waste or wastewater but also are beneficial to crops (application of manure and food-processing waste, application of sewage sludge, and disposal of wastewater through irrigation) and for waste management systems that are designed only for the purpose of wastewater disposal and treatment (overland flow of wastewater, rapid infiltration of wastewater, and slow rate treatment of wastewater).

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Moderately limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Limited* indicates that the soil has one or more features that are significant limitations for the specified use. The limitations can be overcome, but generally require special design, soil reclamation, or installation procedures that may result in additional expense. Fair performance and moderate to high maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The numerical ratings are shown as decimal fractions ranging from 0.00 to 1.00. Limitation classes are assigned as follows:

Not limited	0.00
Slightly limited	0.01 to 0.30
Moderately limited	0.31 to 0.60
Limited	0.61 to 0.99
Very limited	1.00

The numerical ratings used to express the severity of individual limitations indicate gradations between the

point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation.

Limitation class terms, such as *very limited* or *limited, etc.*, limitation ratings, and numerical ratings are shown for each soil feature listed. As many as three soil features may be listed for each soil component if applicable. The overall limitation rating for the soil component is based on the most severe limitation.

Land application of manure and food-processing waste not only disposes of waste material but also improves crop production by increasing the supply of nutrients in the soils where the material is applied. Manure is the excrement of livestock and poultry, and food-processing waste is damaged fruit and vegetables and the peelings, stems, leaves, pits, and soil particles removed in food preparation. The manure and food-processing waste are either solid, slurry, or liquid. Their nitrogen content varies. A high content of nitrogen limits the application rate. Toxic or otherwise dangerous wastes, such as those mixed with the lye used in food processing, are not considered in the ratings.

The ratings are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the waste is applied, and the method by which the waste is applied. The properties that affect absorption include permeability, a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, and available water capacity. The properties that affect plant growth and microbial activity include reaction, the sodium adsorption ratio, salinity, and bulk density. The wind erodibility group, the soil erodibility factor K , and slope are considered in estimating the likelihood of wind erosion or water erosion. Stones, cobbles, a water table, ponding, and flooding can hinder the application of waste.

Land application of municipal sewage sludge not only disposes of waste material but also improves crop production by increasing the supply of nutrients in the soils where the material is applied. In the context of this table, sewage sludge is the residual product of the treatment of municipal sewage. The solid component consists mainly of cell mass, primarily bacteria cells that developed during secondary treatment and have incorporated soluble organics into their own bodies. The sludge has small amounts of sand, silt, and other solid debris. The content of nitrogen varies. Some sludge has constituents that are toxic to plants or hazardous to the food chain, such as heavy metals and exotic organic compounds, and should be analyzed chemically prior to use.

The content of water in the sludge ranges from about 98 percent to less than 40 percent. The sludge is considered liquid if it is more than about 90 percent water, slurry if it is about 50 to 90 percent water, and solid if it is less than about 50 percent water.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the sludge is applied, and the method by which the sludge is applied. The properties that affect absorption, plant growth, and microbial activity include permeability, a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, available water capacity, reaction, salinity, and bulk density. The wind erodibility group, the soil erodibility factor K , and slope are considered in estimating the likelihood of wind erosion or water erosion. Stones, cobbles, a water table, ponding, and flooding can hinder the application of sludge.

Disposal of wastewater by irrigation not only disposes of municipal wastewater and wastewater from food-processing plants, lagoons, and storage ponds but also improves crop production by increasing the amount of water available to crops. The ratings in the table are based on the soil properties that affect the design, construction, management, and performance of the irrigation system. The properties that affect design and management include the sodium adsorption ratio, a water table, ponding, available water capacity, permeability, slope, and flooding. The properties that affect construction include stones, cobbles, depth to bedrock or a cemented pan, a water table, and ponding. The properties that affect performance include depth to bedrock or a cemented pan, bulk density, the sodium adsorption ratio, salinity, reaction, and the cation-exchange capacity, which is used to estimate the capacity of a soil to adsorb heavy metals.

Slow rate treatment of wastewater is a process in which wastewater is applied to land at a rate normally between 0.5 inch and 4.0 inches per week. The application rate commonly exceeds the rate needed for irrigation of cropland. The applied wastewater is treated as it moves through the soil. Much of the treated water percolates to the ground water, and some enters the atmosphere through evapotranspiration. The applied water generally is not allowed to run off the surface. Waterlogging is prevented either through control of the application rate or through the use of tile drains, or both.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, and the application of waste. The properties that affect absorption include the sodium adsorption ratio, a water table, ponding,

available water capacity, permeability, depth to bedrock or a cemented pan, reaction, the cation-exchange capacity, and slope. Reaction, the sodium adsorption ratio, salinity, and bulk density affect plant growth and microbial activity. The wind erodibility group, the soil erodibility factor K , and slope are considered in estimating the likelihood of wind erosion or water erosion. Stones, cobbles, a water table, ponding, and flooding can hinder the application of waste.

Rapid infiltration of wastewater is a process in which wastewater applied in a level basin at a rate of 4 to 120 inches per week percolates through the soil, eventually reaching the ground water. The application rate commonly exceeds the rate needed for irrigation of cropland. Vegetation is not a necessary part of the

treatment; hence, the basins may or may not be vegetated. The thickness of the soil material needed for proper treatment of the wastewater is more than 72 inches. As a result, geologic and hydrologic investigation is needed to ensure proper design and performance and to determine the risk of ground-water pollution.

The ratings in the table are based on the soil properties that affect the risk of pollution and the design, construction, and performance of the system. A water table, ponding, flooding, and depth to bedrock or a cemented pan affect the risk of pollution and the design and construction of the system. Slope, stones, and cobbles also affect design and construction. Permeability and reaction affect performance.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture

(Yields are those that can be expected under a high level of management. They are for nonirrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil.)

Map symbol and soil name	Land capability	Corn	Grain sorghum	Soybeans	Winter wheat
		<u>Bu</u>	<u>Bu</u>	<u>Bu</u>	<u>Bu</u>
15003: Basehor-----	6e	---	---	---	---
Rock outcrop.					
15004: Basehor-----	7s	---	---	---	---
40000: Barden-----	2e	117.00	88.00	39.00	47.00
40003: Woodson-----	3e	106.00	79.00	35.00	42.00
40004: Barden-----	2e	117.00	92.00	39.00	47.00
40005: Sylvania-----	4e	---	---	---	30.00
40006: Barco-----	2e	78.00	58.00	26.00	31.00
Sylvania-----	2e	94.00	71.00	31.00	38.00
40007: Eldorado-----	6e	---	---	---	---
40008: Parsons-----	2s	111.00	83.00	37.00	44.00
44000: Cherokee-----	2s	106.00	79.00	35.00	42.00
46001: Verdigris-----	3w	100.00	79.00	33.00	40.00
46002: Hepler-----	2w	122.00	92.00	41.00	25.00
66001: Dameron-----	3w	94.00	71.00	31.00	38.00
70000: Bona-----	3e	72.00	57.00	24.00	29.00
70006: Crelton-----	2e	97.00	73.00	32.00	39.00
70007: Cliquot-----	4e	---	56.00	---	30.00
70008: Goss-----	4s	61.00	46.00	19.00	23.00
70009: Goss-----	6e	---	40.00	---	21.00

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Grain sorghum	Soybeans	Winter wheat
		<u>Bu</u>	<u>Bu</u>	<u>Bu</u>	<u>Bu</u>
70010: Goss-----	7e	---	---	---	---
70012: Hoberg-----	2e	100.00	75.00	33.00	40.00
70014: Moko-----	7s	---	---	---	---
Rock outcrop.					
70040: Cliquot-----	3e	---	44.00	---	22.00
Bolivar-----	3e	---	57.00	---	29.00
70041: Goss-----	6e	---	---	---	---
70042: Goss-----	7e	---	---	---	---
70043: Sonsac-----	6e	---	---	---	---
Moko-----	6s	---	---	---	---
Rock outcrop-----	8s	---	---	---	---
70044: Sonsac-----	7e	---	---	---	---
Moko-----	7s	---	---	---	---
70045: Keeno-----	4s	54.00	42.00	18.00	22.00
70047: Wanda-----	2e	117.00	92.00	39.00	47.00
70048: Alsup-----	7s	---	---	---	---
73000: Pomme-----	3e	80.00	63.00	27.00	32.00
73008: Viraton-----	2e	69.00	55.00	23.00	28.00
73010: Wilderness-----	4s	---	23.00	---	12.00
73031: Gerald-----	3w	89.00	67.00	30.00	36.00
73059: Pomme-----	2e	86.00	65.00	29.00	34.00
73065: Wilderness-----	4s	---	---	---	---

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Grain sorghum	Soybeans	Winter wheat
		<u>Bu</u>	<u>Bu</u>	<u>Bu</u>	<u>Bu</u>
73075: Hobson-----	2e	75.00	56.00	25.00	30.00
74625: Hartville-----	3e	94.00	71.00	31.00	38.00
74641: Secesh-----	2w	94.00	71.00	31.00	38.00
75378: Sturkie-----	4w	100.00	79.00	33.00	40.00
99000. Pits, quarries					
99001. Water					
99004: Kanima-----	7s	---	---	---	---

Table 6.--Pasture and Hayland Suitability Groups and Yields per Acre of Hay and Pasture

(Yields are those that can be expected under a high level of nonirrigated management by component. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil.)

Map symbol and soil name	Pasture and hayland suita- bility group	Caucasian bluestem hay	Orchardgrass- alfalfa hay	Tall fescue hay	Tall fescue seed	Tall fescue- red clover hay	Warm season grasses hay
		<u>Tons</u>	<u>Tons</u>	<u>Tons</u>	<u>Lbs</u>	<u>Tons</u>	<u>Tons</u>
15003: Basehor-----	ShU	---	---	---	---	---	---
Rock outcrop----	GNS	---	---	---	---	---	---
15004: Basehor-----	ShU	---	---	---	---	---	---
40000: Barden-----	CyU	4.1	4.9	3.5	420.0	4.1	4.9
40003: Woodson-----	CyU	---	---	3.2	380.0	3.7	4.4
40004: Barden-----	CyU	4.1	5.0	3.5	420.0	4.1	4.9
40005: Sylvania-----	GrU	2.6	3.2	2.3	270.0	2.6	3.2
40006: Barco-----	MDU	2.7	3.3	2.3	280.0	2.7	3.3
Sylvania-----	CyU	3.3	4.0	2.8	340.0	3.3	4.0
40007: Eldorado-----	GrU	2.2	2.7	1.9	230.0	2.2	2.7
40008: Parsons-----	CyU	---	---	3.3	400.0	3.9	4.7
44000: Cherokee-----	CyU	---	---	3.2	380.0	3.7	4.4
46001: Verdigris-----	LyO	3.5	4.2	3.0	360.0	3.5	4.2
46002: Hepler-----	WLO	---	---	3.7	440.0	4.3	5.1
66001: Dameron-----	LyO	3.3	4.0	2.8	340.0	3.3	4.0
70000: Bona-----	GrU	2.5	3.1	2.2	253.0	2.5	3.0
70006: Crelton-----	LyP	3.4	4.1	2.9	350.0	3.4	4.1
70007: Cliquot-----	GrU	2.6	3.2	2.3	270.0	2.6	3.2
70008: Goss-----	GrU	2.0	2.5	1.8	220.0	2.0	2.4

Table 6.--Pasture and Hayland Suitability Groups and Yields per Acre of Hay and Pasture--Continued

Map symbol and soil name	Pasture and hayland suita- bility group	Caucasian bluestem hay	Orchardgrass- alfalfa hay	Tall fescue hay	Tall fescue seed	Tall fescue- red clover hay	Warm season grasses hay
		Tons	Tons	Tons	Lbs	Tons	Tons
70009: Goss-----	GrU	1.8	2.2	1.6	190.0	1.8	2.2
70010: Goss-----	GrU	1.3	1.5	1.1	130.0	---	1.5
70012: Hoberg-----	LyP	3.5	4.2	3.0	360.0	3.5	4.2
70014: Moko-----	ShU	---	---	---	---	---	---
Rock outcrop----	GNS	---	---	---	---	---	---
70040: Cliquot-----	CyU	1.9	2.4	1.7	194.0	1.9	2.3
Bolivar-----	MDU	2.5	3.0	2.2	260.0	---	3.0
70041: Goss-----	GrU	1.8	2.2	1.6	190.0	1.8	2.2
70042: Goss-----	GrU	---	---	1.1	---	---	1.3
70043: Sonsac-----	MDU	---	---	0.9	---	---	1.3
Moko-----	ShU	---	---	0.7	---	---	0.9
Rock outcrop----	GNS	---	---	---	---	---	---
70044: Sonsac-----	MDU	---	---	0.4	---	---	0.6
Moko-----	ShU	---	---	0.2	---	---	0.2
70045: Keeno-----	GrP	1.9	2.3	1.7	200.0	1.9	2.3
70047: Wanda-----	LyU	4.1	4.9	3.5	420.0	4.1	4.9
70048: Alsup-----	GrU	2.6	---	2.3	270.0	2.6	3.2
73000: Pomme-----	LyU	2.8	3.4	2.4	282.0	2.8	3.4
73008: Viraton-----	LyP	2.4	3.0	2.1	243.0	2.4	2.9
73010: Wilderness-----	GrP	1.1	1.3	0.9	110.0	0.9	1.1
73031: Gerald-----	WtP	---	2.5	2.7	320.0	3.1	3.7

Table 6.--Pasture and Hayland Suitability Groups and Yields per Acre of Hay and Pasture--Continued

Map symbol and soil name	Pasture and hayland suita- bility group	Caucasian bluestem hay	Orchardgrass- alfalfa hay	Tall fescue hay	Tall fescue seed	Tall fescue- red clover hay	Warm season grasses hay
		<u>Tons</u>	<u>Tons</u>	<u>Tons</u>	<u>Lbs</u>	<u>Tons</u>	<u>Tons</u>
73059: Pomme-----	LyU	3.0	3.6	2.6	310.0	3.0	3.6
73065: Wilderness-----	GrP	1.1	1.3	0.9	110.0	1.1	1.3
73075: Hobson-----	LyP	2.6	3.2	2.3	270.0	2.6	3.2
74625: Hartville-----	WCU	3.3	4.0	2.8	340.0	3.3	4.0
74641: Secesh-----	LyO	3.3	4.0	2.8	340.0	3.3	4.0
75378: Sturkie-----	LyO	3.5	5.0	3.5	400.0	3.5	4.2
99000. Pits, quarries							
99001. Water							
99004: Kanima-----	GrU	---	---	---	---	---	---

Table 7.--Forest Productivity

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available.)

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume	
			of wood fiber cu ft/ac	
15003:				
Basehor-----	common hackberry----	45	---	eastern redcedar,
	green ash-----	45	29	black oak
	northern red oak----	40	29	
	white oak-----	35	29	
Rock outcrop.				
15004:				
Basehor-----	common hackberry----	45	---	eastern redcedar,
	green ash-----	45	29	black oak
	northern red oak----	40	29	
	white oak-----	35	29	
46001:				
Verdigris-----	black walnut-----	69	---	American sycamore,
	common hackberry----	69	---	black walnut,
	eastern cottonwood--	87	100	eastern
	green ash-----	69	72	cottonwood, green
	pin oak-----	75	57	ash, pin oak
	shagbark hickory----	---	---	
	silver maple-----	---	---	
	white oak-----	56	43	
46002:				
Hepler-----	common hackberry----	76	---	American sycamore,
	eastern cottonwood--	90	100	green ash, pecan
	green ash-----	73	72	
	northern red oak----	67	43	
	pin oak-----	80	57	
66001:				
Dameron-----	American sycamore----	---	---	black walnut, green
	black walnut-----	72	---	ash, pecan
	green ash-----	70	72	
	white oak-----	---	---	
70007:				
Cliquot-----	black oak-----	55	43	black oak, eastern
	eastern redcedar----	30	29	redcedar,
	post oak-----	50	29	shortleaf pine
70008:				
Goss-----	white oak-----	60	43	black oak,
	post oak-----	---	---	shortleaf pine,
	blackjack oak-----	---	---	white oak
	black oak-----	---	---	
70009, 70010:				
Goss-----	black oak-----	---	---	black oak,
	blackjack oak-----	---	---	shortleaf pine,
	post oak-----	---	---	white oak
	white oak-----	60	43	

Table 7.--Forest Productivity--Continued

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site	Volume	
		index	of wood fiber	
			cu ft/ac	
70014: Moko-----	eastern redcedar----	30	29	eastern redcedar
Rock outcrop.				
70040: Cliquot-----	black oak-----	55	43	black oak, eastern
	eastern redcedar----	30	29	redcedar,
	post oak-----	50	29	shortleaf pine
Bolivar-----	black oak-----	56	43	shortleaf pine,
	black walnut-----	---	---	white oak
	northern red oak----	73	57	
	white oak-----	53	29	
70041, 70042: Goss-----	black oak-----	---	---	black oak,
	blackjack oak-----	---	---	shortleaf pine,
	post oak-----	---	---	white oak
	white oak-----	60	43	
70043: Sonsac-----	black oak-----	54	43	black oak, eastern
	post oak-----	45	29	redcedar,
	white oak-----	42	29	shortleaf pine,
				white oak
Moko-----	eastern redcedar----	30	29	eastern redcedar
Rock outcrop.				
70044: Sonsac-----	black oak-----	54	43	black oak, eastern
	post oak-----	45	29	redcedar,
	white oak-----	42	29	shortleaf pine,
				white oak
Moko-----	eastern redcedar----	30	29	eastern redcedar
70048: Alsup-----	black oak-----	56	43	black oak, northern
	northern red oak----	60	43	red oak, white oak
	white oak-----	51	43	
73000: Pomme-----	northern red oak----	65	43	black walnut,
	white oak-----	65	43	shortleaf pine,
				white oak
73008: Viraton-----	black oak-----	60	43	black oak,
	shortleaf pine-----	56	86	shortleaf pine,
	white oak-----	55	43	white oak
73010: Wilderness-----	black oak-----	63	43	black oak,
	northern red oak----	64	43	shortleaf pine,
	white oak-----	56	43	white oak

Table 7.--Forest Productivity--Continued

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site	Volume	
		index	of wood fiber	
			cu ft/ac	
73059:				
Pomme-----	northern red oak----	65	43	black walnut,
	white oak-----	65	43	shortleaf pine,
				white oak
73065:				
Wilderness-----	black oak-----	63	43	black oak,
	northern red oak----	64	43	shortleaf pine,
	white oak-----	56	43	white oak
73075:				
Hobson-----	black oak-----	60	43	black oak,
	white oak-----	55	43	shortleaf pine,
				white oak
74625:				
Hartville-----	white oak-----	55	43	eastern cottonwood,
				pin oak,
				green ash
74641:				
Secesh-----	American sycamore---	---	---	American sycamore,
	black oak-----	---	---	black walnut,
	black walnut-----	---	---	shortleaf pine
	white oak-----	60	43	
75378:				
Sturkie-----	American sycamore---	80	86	American sycamore,
	eastern cottonwood--	100	129	black walnut,
	northern red oak----	80	57	eastern
	white oak-----	70	57	cottonwood

Table 8a.--Forestland Management

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Hand planting suitability		Mechanical planting suitability		Harvest equipment operability		Mechanical site preparation (surface)		Road suitability (natural surface)	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
15003:										
Basehor-----	Not limited		Slightly limited		Not limited		Not limited		Moderately limited	
			~slope	0.10					~slippage potential	0.50
			(slightly limited)						(moderately limited)	
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
15004:										
Basehor-----	Slightly limited		Limited		Moderately limited		Moderately limited		Very limited	
	~slope	0.10	~slope	0.87	~slope	0.42	~slope	0.42	~slope	1.00
	(slightly limited)		(limited)		(moderately limited)		(moderately limited)		(very limited)	
			~surface stones	0.09						
			(slightly limited)							
40000:										
Barden-----	Not limited		Not limited		Moderately limited		Slightly limited		Moderately limited	
					~low strength	0.50	~seasonal wetness	0.10	~low strength	0.50
					(moderately limited)		(slightly limited)		(moderately limited)	
					~seasonal wetness	0.10			~seasonal wetness	0.10
					(slightly limited)				(slightly limited)	
40003:										
Woodson-----	Moderately limited		Moderately limited		Moderately limited		Moderately limited		Moderately limited	
	~stickiness (surface)	0.50	~stickiness (surface)	0.50	~low strength	0.50	~stickiness (surface)	0.50	~low strength	0.50
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	
					~stickiness (surface)	0.50	~seasonal wetness	0.45	~stickiness (surface)	0.50
					(moderately limited)		(moderately limited)		(moderately limited)	
					~seasonal wetness	0.45			~seasonal wetness	0.45
					(moderately limited)				(moderately limited)	
40004:										
Barden-----	Not limited		Not limited		Moderately limited		Slightly limited		Moderately limited	
					~low strength	0.50	~seasonal wetness	0.10	~low strength	0.50
					(moderately limited)		(slightly limited)		(moderately limited)	
					~seasonal wetness	0.10			~seasonal wetness	0.10
					(slightly limited)				(slightly limited)	

Table 8a.--Forestland Management--Continued

Map symbol and soil name	Hand planting suitability		Mechanical planting suitability		Harvest equipment operability		Mechanical site preparation (surface)		Road suitability (natural surface)	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
40005:										
Sylvania-----	Not limited		Moderately limited		Moderately limited		Not limited		Limited	
			~slope	0.39	~low strength	0.50			~slippage potential	0.90
			(moderately limited)		(moderately limited)				(limited)	
			~surface stones	0.38					~slope	0.60
			(moderately limited)						(moderately limited)	
									~low strength	0.50
									(moderately limited)	
40006:										
Barco-----	Not limited		Not limited		Moderately limited		Not limited		Moderately limited	
					~low strength	0.50			~low strength	0.50
					(moderately limited)				(moderately limited)	
Sylvania-----	Not limited		Not limited		Moderately limited		Not limited		Moderately limited	
					~low strength	0.50			~low strength	0.50
					(moderately limited)				(moderately limited)	
40007:										
Eldorado-----	Slightly limited		Moderately limited		Moderately limited		Not limited		Moderately limited	
	~small stones	0.03	~surface stones	0.38	~low strength	0.50			~low strength	0.50
	(slightly limited)		(moderately limited)		(moderately limited)				(moderately limited)	
			~slope	0.10						
			(slightly limited)							
			~small stones	0.03						
			(slightly limited)							
40008:										
Parsons-----	Moderately limited		Moderately limited		Moderately limited		Moderately limited		Moderately limited	
	~seasonal wetness	0.60	~seasonal wetness	0.60	~seasonal wetness	0.60	~seasonal wetness	0.60	~seasonal wetness	0.60
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	
					~low strength	0.50			~slippage potential	0.50
					(moderately limited)				(moderately limited)	
									~low strength	0.50
									(moderately limited)	
44000:										
Cherokee-----	Moderately limited		Moderately limited		Moderately limited		Moderately limited		Moderately limited	
	~seasonal wetness	0.60	~seasonal wetness	0.60	~seasonal wetness	0.60	~seasonal wetness	0.60	~seasonal wetness	0.60
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	
					~low strength	0.50			~low strength	0.50
					(moderately limited)				(moderately limited)	

Table 8a.--Forestland Management--Continued

Map symbol and soil name	Hand planting suitability		Mechanical planting suitability		Harvest equipment operability		Mechanical site preparation (surface)		Road suitability (natural surface)	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
46001: Verdigris-----	Not limited		Not limited		Moderately limited ~low strength (moderately limited)	0.50	Not limited		Very limited ~flooding (very limited) ~low strength (moderately limited)	1.00 0.50
46002: Hepler-----	Not limited		Not limited		Moderately limited ~low strength (moderately limited) ~seasonal wetness (slightly limited)	0.50 0.29	Slightly limited ~seasonal wetness (slightly limited)	0.29	Moderately limited ~flooding (moderately limited) ~low strength (moderately limited) ~seasonal wetness (slightly limited)	0.60 0.50 0.29
66001: Dameron-----	Not limited		Not limited		Moderately limited ~low strength (moderately limited)	0.50	Not limited		Very limited ~flooding (very limited) ~low strength (moderately limited)	1.00 0.50
70000: Bona-----	Slightly limited ~small stones (slightly limited)	0.06	Slightly limited ~small stones (slightly limited)	0.06	Moderately limited ~low strength (moderately limited)	0.50	Not limited		Moderately limited ~low strength (moderately limited)	0.50
70006: Crelton-----	Not limited		Not limited		Moderately limited ~low strength (moderately limited) ~seasonal wetness (slightly limited)	0.50 0.15	Slightly limited ~seasonal wetness (slightly limited)	0.15	Moderately limited ~low strength (moderately limited) ~seasonal wetness (slightly limited)	0.50 0.15
70007: Cliquot-----	Slightly limited ~small stones (slightly limited) ~slope (slightly limited)	0.04 0.01	Moderately limited ~slope (moderately limited) ~small stones (slightly limited)	0.60 0.04	Moderately limited ~low strength (moderately limited) ~slope (slightly limited)	0.50 0.05	Slightly limited ~slope (slightly limited)	0.05	Limited ~slope (limited) ~low strength (moderately limited)	0.99 0.50

Table 8a.--Forestland Management--Continued

Map symbol and soil name	Hand planting suitability		Mechanical planting suitability		Harvest equipment operability		Mechanical site preparation (surface)		Road suitability (natural surface)	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70008:										
Goss-----	Slightly limited		Slightly limited		Moderately limited		Not limited		Moderately limited	
	~small stones	0.05	~slope	0.10	~low strength	0.50			~low strength	0.50
	(slightly limited)		(slightly limited)		(moderately limited)				(moderately limited)	
			~small stones	0.05						
			(slightly limited)							
70009:										
Goss-----	Slightly limited		Moderately limited		Moderately limited		Not limited		Moderately limited	
	~small stones	0.10	~slope	0.34	~low strength	0.50			~low strength	0.50
	(slightly limited)		(moderately limited)		(moderately limited)				(moderately limited)	
			~small stones	0.10					~slope	0.45
			(slightly limited)						(moderately limited)	
70010:										
Goss-----	Moderately limited		Limited		Slightly limited		Moderately limited		Very limited	
	~large stones	0.40	~large stones	0.73	~slope	0.20	~large stones	0.40	~slope	1.00
	(moderately limited)		(limited)		(slightly limited)		(moderately limited)		(very limited)	
	~small stones	0.07	~slope	0.72			~slope	0.20		
	(slightly limited)		(limited)				(slightly limited)			
	~slope	0.05	~small stones	0.07						
	(slightly limited)		(slightly limited)							
70012:										
Hoberg-----	Not limited		Not limited		Moderately limited		Slightly limited		Moderately limited	
					~low strength	0.50	~seasonal wetness	0.20	~low strength	0.50
					(moderately limited)		(slightly limited)		(moderately limited)	
					~seasonal wetness	0.20			~seasonal wetness	0.20
					(slightly limited)				(slightly limited)	
70014:										
Moko-----	Slightly limited		Limited		Moderately limited		Moderately limited		Very limited	
	~slope	0.14	~slope	0.99	~slope	0.60	~slope	0.60	~slope	1.00
	(slightly limited)		(limited)		(moderately limited)		(moderately limited)		(very limited)	
	~small stones	0.02	~large stones	0.24					~slippage potential	0.50
	(slightly limited)		(slightly limited)						(moderately limited)	
			~surface stones	0.09						
			(slightly limited)							
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
70040:										
Cliquot-----	Not limited		Not limited		Not limited		Not limited		Limited	
									~slippage potential	0.90
									(limited)	

Table 8a.--Forestland Management--Continued

Map symbol and soil name	Hand planting suitability		Mechanical planting suitability		Harvest equipment operability		Mechanical site preparation (surface)		Road suitability (natural surface)	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70040:										
Bolivar-----	Not limited		Not limited		Not limited		Not limited		Moderately limited	
									~slippage potential	0.50
									(moderately limited)	
70041:										
Goss-----	Slightly limited		Moderately limited		Not limited		Not limited		Limited	
	~small stones	0.13	~slope	0.56					~slope	0.91
	(slightly limited)		(moderately limited)						(limited)	
			~small stones	0.13						
			(slightly limited)							
70042:										
Goss-----	Very limited		Limited		Moderately limited		Limited		Very limited	
	~small stones	0.99	~small stones	0.99	~slope	0.36	~small stones	1.00	~slope	1.00
	(limited)		(limited)		(moderately limited)		(limited)		(very limited)	
	~slope	0.09	~slope	0.83			~slope	0.36		
	(slightly limited)		(limited)				(moderately limited)			
70043:										
Sonsac-----	Limited		Very limited		Not limited		Limited		Limited	
	~large stones	0.76	~large stones >35%	1.00			~large stones	0.76	~slope	0.68
	(limited)		(very limited)				(limited)		(limited)	
			~slope	0.43						
			(moderately limited)							
Moko-----	Slightly limited		Moderately limited		Not limited		Slightly limited		Limited	
	~small stones	0.24	~slope	0.43			~small stones	0.01	~slope	0.68
	(slightly limited)		(moderately limited)				(slightly limited)		(limited)	
			~small stones	0.24					~slippage potential	0.50
			(slightly limited)						(moderately limited)	
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
70044:										
Sonsac-----	Slightly limited		Moderately limited		Moderately limited		Slightly limited		Limited	
	~small stones	0.04	~slope	0.60	~low strength	0.50	~slope	0.05	~slope	0.99
	(slightly limited)		(moderately limited)		(moderately limited)		(slightly limited)		(limited)	
	~slope	0.01	~small stones	0.04	~slope	0.05			~slippage potential	0.50
	(slightly limited)		(slightly limited)		(slightly limited)				(moderately limited)	
									~low strength	0.50
									(moderately limited)	

Table 8a.--Forestland Management--Continued

Map symbol and soil name	Hand planting suitability		Mechanical planting suitability		Harvest equipment operability		Mechanical site preparation (surface)		Road suitability (natural surface)	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70044:										
Moko-----	Slightly limited		Limited		Moderately limited		Slightly limited		Very limited	
	~small stones	0.17	~slope	0.68	~low strength	0.50	~slope	0.15	~slope	1.00
	(slightly limited)		(limited)		(moderately limited)		(slightly limited)		(very limited)	
	~slope	0.04	~small stones	0.17	~slope	0.15			~slippage potential	0.50
	(slightly limited)		(slightly limited)		(slightly limited)				(moderately limited)	
									~low strength	0.50
									(moderately limited)	
70045:										
Keeno-----	Not limited		Slightly limited		Moderately limited		Slightly limited		Moderately limited	
			~slope	0.10	~low strength	0.50	~seasonal wetness	0.20	~low strength	0.50
			(slightly limited)		(moderately limited)		(slightly limited)		(moderately limited)	
					~seasonal wetness	0.20			~seasonal wetness	0.20
					(slightly limited)				(slightly limited)	
70047:										
Wanda-----	Not limited		Not limited		Moderately limited		Not limited		Moderately limited	
					~low strength	0.50			~low strength	0.50
					(moderately limited)				(moderately limited)	
70048:										
Alsup-----	Not limited		Moderately limited		Moderately limited		Not limited		Moderately limited	
			~slope	0.39	~low strength	0.50			~slope	0.60
			(moderately limited)		(moderately limited)				(moderately limited)	
			~surface stones	0.38					~low strength	0.50
			(moderately limited)						(moderately limited)	
73000:										
Pomme-----	Not limited		Slightly limited		Moderately limited		Not limited		Moderately limited	
			~slope	0.10	~low strength	0.50			~slippage potential	0.50
			(slightly limited)		(moderately limited)				(moderately limited)	
									~low strength	0.50
									(moderately limited)	
73008:										
Viraton-----	Not limited		Not limited		Moderately limited		Slightly limited		Moderately limited	
					~low strength	0.50	~seasonal wetness	0.26	~low strength	0.50
					(moderately limited)		(slightly limited)		(moderately limited)	
					~seasonal wetness	0.26			~seasonal wetness	0.26
					(slightly limited)				(slightly limited)	

Table 8a.--Forestland Management--Continued

Map symbol and soil name	Hand planting suitability		Mechanical planting suitability		Harvest equipment operability		Mechanical site preparation (surface)		Road suitability (natural surface)	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
73010:										
Wilderness-----	Slightly limited		Slightly limited		Moderately limited		Moderately limited		Moderately limited	
	~small stones	0.01	~small stones	0.01	~low strength	0.50	~seasonal wetness	0.34	~low strength	0.50
	(slightly limited)		(slightly limited)		(moderately limited)		(moderately limited)		(moderately limited)	
					~seasonal wetness	0.34			~seasonal wetness	0.34
					(moderately limited)				(moderately limited)	
73031:										
Gerald-----	Not limited		Not limited		Moderately limited		Slightly limited		Moderately limited	
					~low strength	0.50	~seasonal wetness	0.29	~low strength	0.50
					(moderately limited)		(slightly limited)		(moderately limited)	
					~seasonal wetness	0.29			~seasonal wetness	0.29
					(slightly limited)				(slightly limited)	
73059:										
Pomme-----	Not limited		Not limited		Moderately limited		Not limited		Moderately limited	
					~low strength	0.50			~slippage potential	0.50
					(moderately limited)				(moderately limited)	
									~low strength	0.50
									(moderately limited)	
73065:										
Wilderness-----	Moderately limited		Limited		Slightly limited		Moderately limited		Slightly limited	
	~large stones	0.40	~large stones	0.73	~seasonal wetness	0.22	~large stones	0.40	~seasonal wetness	0.22
	(moderately limited)		(limited)		(slightly limited)		(moderately limited)		(slightly limited)	
			~surface stones	0.38			~seasonal wetness	0.22		
			(moderately limited)				(slightly limited)			
73075:										
Hobson-----	Not limited		Not limited		Moderately limited		Slightly limited		Moderately limited	
					~low strength	0.50	~seasonal wetness	0.15	~low strength	0.50
					(moderately limited)		(slightly limited)		(moderately limited)	
					~seasonal wetness	0.15			~seasonal wetness	0.15
					(slightly limited)				(slightly limited)	
74625:										
Hartville-----	Not limited		Not limited		Moderately limited		Slightly limited		Moderately limited	
					~low strength	0.50	~seasonal wetness	0.26	~low strength	0.50
					(moderately limited)		(slightly limited)		(moderately limited)	
					~seasonal wetness	0.26			~seasonal wetness	0.26
					(slightly limited)				(slightly limited)	

Table 8a.--Forestland Management--Continued

Map symbol and soil name	Hand planting suitability		Mechanical planting suitability		Harvest equipment operability		Mechanical site preparation (surface)		Road suitability (natural surface)	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
74641:										
Secesh-----	Not limited		Not limited		Moderately limited		Not limited		Moderately limited	
					~low strength	0.50			~flooding	0.60
					(moderately limited)				(moderately limited)	
									~low strength	0.50
									(moderately limited)	
75378:										
Sturkie-----	Not limited		Not limited		Moderately limited		Not limited		Very limited	
					~low strength	0.50			~flooding	1.00
					(moderately limited)				(very limited)	
									~low strength	0.50
									(moderately limited)	
99000:										
Pits,										
quarries-----	Not rated		Not rated		Not rated		Not rated		Not rated	
99001:										
Water-----	Not rated		Not rated		Not rated		Not rated		Not rated	
99004:										
Kanima-----	Moderately limited		Very limited		Limited		Limited		Very limited	
	~small stones	0.60	~slope	1.00	~slope	0.76	~slope	0.76	~slope	1.00
	(moderately limited)		(very limited)		(limited)		(limited)		(very limited)	
	~slope	0.19	~small stones	0.60			~small stones	0.60		
	(slightly limited)		(moderately limited)				(moderately limited)			

Table 8b.--Forestland Management

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Potential erosion hazard (road/trail)	Potential erosion hazard (off-road/off-trail)	Soil rutting hazard	Log landing suitability	Potential seedling mortality				
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	
15003:									
Basehor-----	Moderately limited		Slightly limited		Moderately limited		Moderately limited		Not limited
	~slope/erodibility	0.38	~slope/erodibility	0.12	~low strength	0.50	~slippage potential	0.50	
	(moderately limited)		(slightly limited)		(moderately limited)		(moderately limited)		
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated
15004:									
Basehor-----	Very limited		Moderately limited		Moderately limited		Very limited		Not limited
	~slope/erodibility	1.00	~slope/erodibility	0.43	~low strength	0.50	~slope	1.00	
	(very limited)		(moderately limited)		(moderately limited)		(very limited)		
40000:									
Barden-----	Slightly limited		Slightly limited		Limited		Moderately limited		Not limited
	~slope/erodibility	0.22	~slope/erodibility	0.05	~low strength	0.80	~low strength	0.50	
	(slightly limited)		(slightly limited)		(limited)		(moderately limited)		
					~seasonal wetness	0.10	~seasonal wetness	0.10	
					(slightly limited)		(slightly limited)		
40003:									
Woodson-----	Slightly limited		Slightly limited		Limited		Moderately limited		Moderately limited
	~slope/erodibility	0.22	~slope/erodibility	0.05	~low strength	0.80	~low strength	0.50	~seasonal wetness
	(slightly limited)		(slightly limited)		(limited)		(moderately limited)		(moderately limited)
					~seasonal wetness	0.45	~stickiness (surface)	0.50	
					(moderately limited)		(moderately limited)		
							~seasonal wetness	0.45	
							(moderately limited)		
40004:									
Barden-----	Moderately limited		Slightly limited		Limited		Moderately limited		Not limited
	~slope/erodibility	0.44	~slope/erodibility	0.10	~low strength	0.80	~low strength	0.50	
	(moderately limited)		(slightly limited)		(limited)		(moderately limited)		
					~seasonal wetness	0.10	~seasonal wetness	0.10	
					(slightly limited)		(slightly limited)		

Table 8b.--Forestland Management--Continued

Map symbol and soil name	Potential erosion hazard (road/trail)		Potential erosion hazard (off-road/off-trail)		Soil rutting hazard		Log landing suitability		Potential seedling mortality	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
40005:										
Sylvania-----	Very limited		Slightly limited		Limited		Limited		Not limited	
	~slope/erodibility	1.00	~slope/erodibility	0.20	~low strength	0.80	~slippage potential	0.90		
	(very limited)		(slightly limited)		(limited)		(limited)			
							~slope	0.60		
							(moderately limited)			
							~low strength	0.50		
							(moderately limited)			
40006:										
Barco-----	Moderately limited		Slightly limited		Limited		Moderately limited		Not limited	
	~slope/erodibility	0.44	~slope/erodibility	0.08	~low strength	0.80	~low strength	0.50		
	(moderately limited)		(slightly limited)		(limited)		(moderately limited)			
Sylvania-----	Moderately limited		Slightly limited		Limited		Moderately limited		Not limited	
	~slope/erodibility	0.44	~slope/erodibility	0.08	~low strength	0.80	~low strength	0.50		
	(moderately limited)		(slightly limited)		(limited)		(moderately limited)			
40007:										
Eldorado-----	Moderately limited		Slightly limited		Limited		Moderately limited		Not limited	
	~slope/erodibility	0.38	~slope/erodibility	0.12	~low strength	0.80	~low strength	0.50		
	(moderately limited)		(slightly limited)		(limited)		(moderately limited)			
40008:										
Parsons-----	Slightly limited		Slightly limited		Limited		Moderately limited		Moderately limited	
	~slope/erodibility	0.11	~slope/erodibility	0.02	~low strength	0.80	~seasonal wetness	0.60	~seasonal wetness	0.60
	(slightly limited)		(slightly limited)		(limited)		(moderately limited)		(moderately limited)	
					~seasonal wetness	0.60	~slippage potential	0.50		
					(moderately limited)		(moderately limited)			
							~low strength	0.50		
							(moderately limited)			
44000:										
Cherokee-----	Slightly limited		Slightly limited		Limited		Moderately limited		Moderately limited	
	~slope/erodibility	0.06	~slope/erodibility	0.01	~low strength	0.80	~seasonal wetness	0.60	~seasonal wetness	0.60
	(slightly limited)		(slightly limited)		(limited)		(moderately limited)		(moderately limited)	
					~seasonal wetness	0.60	~low strength	0.50		
					(moderately limited)		(moderately limited)			
46001:										
Verdigris-----	Slightly limited		Slightly limited		Limited		Very limited		Limited	
	~slope/erodibility	0.06	~slope/erodibility	0.01	~low strength	0.80	~flooding	1.00	~flooding	0.90
	(slightly limited)		(slightly limited)		(limited)		(very limited)		(limited)	
							~low strength	0.50		
							(moderately limited)			

Table 8b.--Forestland Management--Continued

Map symbol and soil name	Potential erosion hazard (road/trail)		Potential erosion hazard (off-road/off-trail)		Soil rutting hazard		Log landing suitability		Potential seedling mortality	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
46002:										
Hepler-----	Slightly limited		Slightly limited		Limited		Moderately limited		Moderately limited	
	~slope/erodibility	0.06	~slope/erodibility	0.01	~low strength	0.80	~flooding	0.60	~flooding	0.60
	(slightly limited)		(slightly limited)		(limited)		(moderately limited)		(moderately limited)	
					~seasonal wetness	0.29	~low strength	0.50		
					(slightly limited)		(moderately limited)			
							~seasonal wetness	0.29		
							(slightly limited)			
66001:										
Dameron-----	Slightly limited		Slightly limited		Limited		Very limited		Limited	
	~slope/erodibility	0.11	~slope/erodibility	0.02	~low strength	0.80	~flooding	1.00	~flooding	0.90
	(slightly limited)		(slightly limited)		(limited)		(very limited)		(limited)	
							~low strength	0.50		
							(moderately limited)			
70000:										
Bona-----	Moderately limited		Slightly limited		Limited		Moderately limited		Not limited	
	~slope/erodibility	0.31	~slope/erodibility	0.10	~low strength	0.80	~low strength	0.50		
	(moderately limited)		(slightly limited)		(limited)		(moderately limited)			
70006:										
Credon-----	Moderately limited		Slightly limited		Limited		Moderately limited		Not limited	
	~slope/erodibility	0.33	~slope/erodibility	0.06	~low strength	0.80	~low strength	0.50		
	(moderately limited)		(slightly limited)		(limited)		(moderately limited)			
					~seasonal wetness	0.15	~seasonal wetness	0.15		
					(slightly limited)		(slightly limited)			
70007:										
Cliquot-----	Very limited		Slightly limited		Limited		Limited		Not limited	
	~slope/erodibility	1.00	~slope/erodibility	0.29	~low strength	0.80	~slope	0.99		
	(very limited)		(slightly limited)		(limited)		(limited)			
							~low strength	0.50		
							(moderately limited)			
70008:										
Goss-----	Limited		Slightly limited		Limited		Moderately limited		Slightly limited	
	~slope/erodibility	0.67	~slope/erodibility	0.12	~low strength	0.80	~low strength	0.50	~droughty	0.01
	(limited)		(slightly limited)		(limited)		(moderately limited)		(slightly limited)	

Table 8b.--Forestland Management--Continued

Map symbol and soil name	Potential erosion hazard (road/trail)		Potential erosion hazard (off-road/off-trail)		Soil rutting hazard		Log landing suitability		Potential seedling mortality	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70009:										
Goss-----	Moderately limited		Slightly limited		Limited		Moderately limited		Slightly limited	
	~slope/erodibility	0.56	~slope/erodibility	0.18	~low strength	0.80	~low strength	0.50	~droughty	0.06
	(moderately limited)		(slightly limited)		(limited)		(moderately limited)		(slightly limited)	
							~slope	0.45		
							(moderately limited)			
70010:										
Goss-----	Limited		Moderately limited		Not limited		Very limited		Moderately limited	
	~slope/erodibility	0.69	~slope/erodibility	0.35			~slope	1.00	~droughty	0.39
	(limited)		(moderately limited)				(very limited)		(moderately limited)	
70012:										
Hoberg-----	Slightly limited		Slightly limited		Limited		Moderately limited		Not limited	
	~slope/erodibility	0.22	~slope/erodibility	0.04	~low strength	0.80	~low strength	0.50		
	(slightly limited)		(slightly limited)		(limited)		(moderately limited)			
					~seasonal wetness	0.20	~seasonal wetness	0.20		
					(slightly limited)		(slightly limited)			
70014:										
Moko-----	Limited		Moderately limited		Not limited		Very limited		Limited	
	~slope/erodibility	0.96	~slope/erodibility	0.49			~slope	1.00	~droughty	0.82
	(limited)		(moderately limited)				(very limited)		(limited)	
							~slippage potential	0.50		
							(moderately limited)			
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
70040:										
Cliquot-----	Moderately limited		Slightly limited		Moderately limited		Limited		Not limited	
	~slope/erodibility	0.33	~slope/erodibility	0.06	~low strength	0.50	~slippage potential	0.90		
	(moderately limited)		(slightly limited)		(moderately limited)		(limited)			
Bolivar-----	Moderately limited		Slightly limited		Moderately limited		Moderately limited		Not limited	
	~slope/erodibility	0.33	~slope/erodibility	0.06	~low strength	0.50	~slippage potential	0.50		
	(moderately limited)		(slightly limited)		(moderately limited)		(moderately limited)			
70041:										
Goss-----	Limited		Slightly limited		Not limited		Limited		Not limited	
	~slope/erodibility	0.88	~slope/erodibility	0.27			~slope	0.91		
	(limited)		(slightly limited)				(limited)			

Table 8b.--Forestland Management--Continued

Map symbol and soil name	Potential erosion hazard (road/trail)		Potential erosion hazard (off-road/off-trail)		Soil rutting hazard		Log landing suitability		Potential seedling mortality	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70042:										
Goss-----	Very limited		Moderately limited		Not limited		Very limited		Slightly limited	
	~slope/erodibility	1.00	~slope/erodibility	0.41			~slope	1.00	~droughty	0.04
	(very limited)		(moderately limited)				(very limited)		(slightly limited)	
70043:										
Sonsac-----	Limited		Slightly limited		Not limited		Limited		Not limited	
	~slope/erodibility	0.69	~slope/erodibility	0.22			~slope	0.68		
	(limited)		(slightly limited)				(limited)			
Moko-----	Limited		Slightly limited		Not limited		Limited		Limited	
	~slope/erodibility	0.69	~slope/erodibility	0.22			~slope	0.68	~droughty	0.88
	(limited)		(slightly limited)				(limited)		(limited)	
							~slippage potential	0.50		
							(moderately limited)			
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
70044:										
Sonsac-----	Very limited		Slightly limited		Limited		Limited		Not limited	
	~slope/erodibility	1.00	~slope/erodibility	0.29	~low strength	0.80	~slope	0.99		
	(very limited)		(slightly limited)		(limited)		(limited)			
							~slippage potential	0.50		
							(moderately limited)			
							~low strength	0.50		
							(moderately limited)			
Moko-----	Very limited		Moderately limited		Limited		Very limited		Slightly limited	
	~slope/erodibility	1.00	~slope/erodibility	0.33	~low strength	0.80	~slope	1.00	~droughty	0.17
	(very limited)		(moderately limited)		(limited)		(very limited)		(slightly limited)	
							~slippage potential	0.50		
							(moderately limited)			
							~low strength	0.50		
							(moderately limited)			
70045:										
Keeno-----	Limited		Slightly limited		Limited		Moderately limited		Not limited	
	~slope/erodibility	0.67	~slope/erodibility	0.12	~low strength	0.80	~low strength	0.50		
	(limited)		(slightly limited)		(limited)		(moderately limited)			
					~seasonal wetness	0.20	~seasonal wetness	0.20		
					(slightly limited)		(slightly limited)			
70047:										
Wanda-----	Moderately limited		Slightly limited		Limited		Moderately limited		Not limited	
	~slope/erodibility	0.56	~slope/erodibility	0.12	~low strength	0.80	~low strength	0.50		
	(moderately limited)		(slightly limited)		(limited)		(moderately limited)			

Table 8b.--Forestland Management--Continued

Map symbol and soil name	Potential erosion hazard (road/trail)	Potential erosion hazard (off-road/off-trail)	Soil rutting hazard	Log landing suitability	Potential seedling mortality					
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70048:										
Alsup-----	Very limited		Slightly limited		Limited		Moderately limited		Not limited	
	~slope/erodibility	1.00	~slope/erodibility	0.24	~low strength	0.80	~slope	0.60		
	(very limited)		(slightly limited)		(limited)		(moderately limited)			
							~low strength	0.50		
							(moderately limited)			
73000:										
Pomme-----	Limited		Slightly limited		Limited		Moderately limited		Not limited	
	~slope/erodibility	0.67	~slope/erodibility	0.12	~low strength	0.80	~slippage potential	0.50		
	(limited)		(slightly limited)		(limited)		(moderately limited)			
							~low strength	0.50		
							(moderately limited)			
73008:										
Viraton-----	Moderately limited		Slightly limited		Limited		Moderately limited		Not limited	
	~slope/erodibility	0.44	~slope/erodibility	0.10	~low strength	0.80	~low strength	0.50		
	(moderately limited)		(slightly limited)		(limited)		(moderately limited)			
					~seasonal wetness	0.26	~seasonal wetness	0.26		
					(slightly limited)		(slightly limited)			
73010:										
Wilderness----	Moderately limited		Slightly limited		Limited		Moderately limited		Slightly limited	
	~slope/erodibility	0.33	~slope/erodibility	0.06	~low strength	0.80	~low strength	0.50	~seasonal wetness	0.11
	(moderately limited)		(slightly limited)		(limited)		(moderately limited)		(slightly limited)	
					~seasonal wetness	0.34	~seasonal wetness	0.34		
					(moderately limited)		(moderately limited)			
73031:										
Gerald-----	Slightly limited		Slightly limited		Limited		Moderately limited		Not limited	
	~slope/erodibility	0.11	~slope/erodibility	0.02	~low strength	0.80	~low strength	0.50		
	(slightly limited)		(slightly limited)		(limited)		(moderately limited)			
					~seasonal wetness	0.29	~seasonal wetness	0.29		
					(slightly limited)		(slightly limited)			
73059:										
Pomme-----	Moderately limited		Slightly limited		Limited		Moderately limited		Not limited	
	~slope/erodibility	0.33	~slope/erodibility	0.07	~low strength	0.80	~slippage potential	0.50		
	(moderately limited)		(slightly limited)		(limited)		(moderately limited)			
							~low strength	0.50		
							(moderately limited)			
73065:										
Wilderness----	Slightly limited		Slightly limited		Slightly limited		Slightly limited		Not limited	
	~slope/erodibility	0.15	~slope/erodibility	0.08	~seasonal wetness	0.22	~seasonal wetness	0.22		
	(slightly limited)		(slightly limited)		(slightly limited)		(slightly limited)			

Table 8b.--Forestland Management--Continued

Map symbol and soil name	Potential erosion hazard (road/trail)		Potential erosion hazard (off-road/off-trail)		Soil rutting hazard		Log landing suitability		Potential seedling mortality	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
73075:										
Hobson-----	Slightly limited		Slightly limited		Limited		Moderately limited		Not limited	
	~slope/erodibility	0.22	~slope/erodibility	0.05	~low strength	0.80	~low strength	0.50		
	(slightly limited)		(slightly limited)		(limited)		(moderately limited)			
					~seasonal wetness	0.15	~seasonal wetness	0.15		
					(slightly limited)		(slightly limited)			
74625:										
Hartville-----	Moderately limited		Slightly limited		Limited		Moderately limited		Not limited	
	~slope/erodibility	0.33	~slope/erodibility	0.07	~low strength	0.80	~low strength	0.50		
	(moderately limited)		(slightly limited)		(limited)		(moderately limited)			
					~seasonal wetness	0.26	~seasonal wetness	0.26		
					(slightly limited)		(slightly limited)			
74641:										
Secesh-----	Slightly limited		Slightly limited		Limited		Moderately limited		Moderately limited	
	~slope/erodibility	0.11	~slope/erodibility	0.02	~low strength	0.80	~flooding	0.60	~flooding	0.60
	(slightly limited)		(slightly limited)		(limited)		(moderately limited)		(moderately limited)	
							~low strength	0.50		
							(moderately limited)			
75378:										
Sturkie-----	Slightly limited		Slightly limited		Limited		Very limited		Limited	
	~slope/erodibility	0.11	~slope/erodibility	0.02	~low strength	0.80	~flooding	1.00	~flooding	0.90
	(slightly limited)		(slightly limited)		(limited)		(very limited)		(limited)	
							~low strength	0.50		
							(moderately limited)			
99000:										
Pits,										
quarries-----	Not rated		Not rated		Not rated		Not rated		Not rated	
99001:										
Water-----	Not rated		Not rated		Not rated		Not rated		Not rated	
99004:										
Kanima-----	Very limited		Moderately limited		Not limited		Very limited		Slightly limited	
	~slope/erodibility	1.00	~slope/erodibility	0.57			~slope	1.00	~droughty	0.03
	(very limited)		(moderately limited)				(very limited)		(slightly limited)	

Table 9.--Windbreaks and Environmental Plantings

(Only the soils suitable for windbreaks and environmental plantings are listed. Absence of an entry indicates that trees generally do not grow to the given height.)

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
40000: Barden-----	fragrant sumac, ninebark	gray dogwood, possumhaw, Amur maple	eastern redcedar	Austrian pine, Norway spruce, common hackberry, honeylocust, pin oak	---
40003: Woodson-----	fragrant sumac, ninebark	gray dogwood, possumhaw, Amur maple	eastern redcedar	Austrian pine, Norway spruce, common hackberry, honeylocust, pin oak	---
40004: Barden-----	fragrant sumac, ninebark	gray dogwood, possumhaw, Amur maple	eastern redcedar	Austrian pine, Norway spruce, common hackberry, honeylocust, pin oak	---
40005: Sylvania-----	common ninebark, fragrant sumac	Amur maple, gray dogwood, possumhaw	eastern redcedar	Austrian pine, Norway spruce, common hackberry, honeylocust, pin oak	---
40006: Barco-----	American plum, common lilac, fragrant sumac	Washington hawthorn, gray dogwood	Austrian pine, black oak, common hackberry, eastern redcedar, white ash	shortleaf pine	---
Sylvania-----	---	Ohio buckeye, bitternut hickory, cockspur hawthorn, common chokecherry eastern redcedar	Austrian pine, honeylocust, red maple, common hackberry, green ash	eastern cottonwood	Carolina poplar
40007: Eldorado-----	Amur honeysuckle, common lilac, fragrant sumac	autumn olive	Russian olive, bur oak, common hackberry, eastern redcedar, Austrian pine, green ash, honeylocust	Siberian elm	---
44000: Cherokee-----	fragrant sumac, ninebark	gray dogwood, possumhaw, Amur maple	eastern redcedar	Austrian pine, Norway spruce, common hackberry, honeylocust, pin oak	---
46001: Verdigris-----	---	American plum, eastern redbud	eastern redcedar, red mulberry	Russian olive, bur oak, osageorange, green ash, black locust	honeylocust, eastern cottonwood

Table 9.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
46002: Hepler-----	American plum, fragrant sumac	blackhaw, gray dogwood	Washington hawthorn, nannyberry, eastern redcedar	baldcypress, green ash, sweetgum	eastern white pine, pin oak
70006: Crelton-----	American cranberrybush, American plum, black chokeberry, common chokecherry, common elderberry, common juniper, coralberry, mapleleaf viburnum, roughleaf dogwood, silky dogwood	American hazelnut, Washington hawthorn, arborvitae, common serviceberry, nannyberry, prairie crabapple, smooth sumac, bur oak, chinkapin oak, eastern redcedar	Virginia pine, eastern white pine, red pine, black oak, common hackberry, green ash, shortleaf pine	Carolina poplar, eastern cottonwood	---
70008, 70009, 70010: Goss-----	fragrant sumac	American plum, gray dogwood, southern arrowwood	Washington hawthorn, eastern redbud, eastern redcedar	white fir, green ash, northern red oak, tuliptree	eastern white pine
70012: Hoberg-----	American cranberrybush, American plum, black chokeberry, common chokecherry, common elderberry, common juniper, coralberry, mapleleaf viburnum, roughleaf dogwood, silky dogwood	American hazelnut, Washington hawthorn, arborvitae, common serviceberry, nannyberry, prairie crabapple, smooth sumac, bur oak, chinkapin oak, eastern redcedar	Virginia pine, eastern white pine, red pine, black oak, common hackberry, green ash, shortleaf pine	Carolina poplar, eastern cottonwood	---
70041: Goss-----	Amur honeysuckle, common lilac, fragrant sumac	autumn olive	Russian olive, bur oak, common hackberry, eastern redcedar, Austrian pine, green ash, honeylocust	Siberian elm	---
70042: Goss-----	fragrant sumac	American plum, gray dogwood, southern arrowwood	Washington hawthorn, eastern redbud, eastern redcedar	white fir, green ash, northern red oak, tuliptree	eastern white pine
70045: Keeno-----	American cranberrybush, American plum, black chokeberry, common chokecherry, common elderberry, common juniper, coralberry, mapleleaf viburnum, roughleaf dogwood, silky dogwood	American hazelnut, Washington hawthorn, arborvitae, common serviceberry, nannyberry, prairie crabapple, smooth sumac, bur oak, chinkapin oak, eastern redcedar	Virginia pine, eastern white pine, red pine, black oak, common hackberry, green ash, shortleaf pine	Carolina poplar, eastern cottonwood	---

Table 9.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
70047: Wanda-----	fragrant sumac	American plum, gray dogwood, southern arrowwood	Washington hawthorn, eastern redbud, eastern redcedar	white fir, green ash, northern red oak, tuliptree	eastern white pine
73008: Viraton-----	American plum, common lilac, fragrant sumac	Washington hawthorn, gray dogwood, Amur maple	Austrian pine, Virginia pine, common hackberry, eastern redcedar, unknown, honeylocust	---	---
73010: Wilderness-----	American plum, common lilac, fragrant sumac	Washington hawthorn, gray dogwood, Amur maple	Austrian pine, Virginia pine, common hackberry, eastern redcedar, unknown, honeylocust	---	---
73031: Gerald-----	American cranberrybush, American plum, black chokeberry, common chokecherry, common elderberry, common juniper, coralberry, mapleleaf viburnum, roughleaf dogwood, silky dogwood	American hazelnut, Washington hawthorn, arborvitae, common serviceberry, nannyberry, prairie crabapple, smooth sumac, bur oak, chinkapin oak, eastern redcedar	Virginia pine, eastern white pine, red pine, black oak, common hackberry, green ash, shortleaf pine	Carolina poplar, eastern cottonwood	---
73075: Hobson-----	Amur honeysuckle, common lilac	Amur maple, autumn olive	Manchurian crabapple, Russian olive, eastern redcedar, common hackberry, green ash, Austrian pine, jack pine	honeylocust	---
74641: Secesh-----	---	Amur honeysuckle, common lilac, Amur maple, autumn olive	eastern redcedar	Austrian pine, common hackberry, green ash, honeylocust, pin oak, eastern white pine	eastern cottonwood

Table 10.--Recreational Site Development

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds		Paths and trails	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
15003:								
Basehor-----	Limited		Limited		Very limited		Not limited	
	~shallow to bedrock (limited)	0.90	~shallow to bedrock (limited)	0.90	~bedrock <20 in. (very limited)	1.00		
					~slope (limited)	0.98		
Rock outcrop-----	Not rated		Not rated		Not rated		Not rated	
15004:								
Basehor-----	Very limited		Very limited		Very limited		Limited	
	~slope (very limited)	1.00	~slope (very limited)	1.00	~slope (very limited)	1.00	~slope (limited)	0.67
	~shallow to bedrock (limited)	0.90	~shallow to bedrock (limited)	0.90	~bedrock <20 in. (very limited)	1.00	~large surface stones (moderately limited)	0.37
	~large surface stones (moderately limited)	0.37	~large surface stones (moderately limited)	0.37				
40000:								
Barden-----	Moderately limited		Moderately limited		Moderately limited		Not limited	
	~percs slowly (moderately limited)	0.39	~percs slowly (moderately limited)	0.39	~percs slowly (moderately limited)	0.39		
40003:								
Woodson-----	Very limited		Very limited		Very limited		Limited	
	~percs slowly (very limited)	1.00	~percs slowly (very limited)	1.00	~percs slowly (very limited)	1.00	~wetness (limited)	0.81
	~wetness (very limited)	1.00	~wetness (limited)	0.81	~wetness (very limited)	1.00		
40004:								
Barden-----	Moderately limited		Moderately limited		Moderately limited		Not limited	
	~percs slowly (moderately limited)	0.39	~percs slowly (moderately limited)	0.39	~slope (moderately limited)	0.40		
					~percs slowly (moderately limited)	0.39		
40005:								
Sylvania-----	Limited		Limited		Very limited		Limited	
	~large surface stones (limited)	0.70	~large surface stones (limited)	0.70	~slope (very limited)	1.00	~large surface stones (limited)	0.70
	~too acid (slightly limited)	0.18	~too acid (slightly limited)	0.18	~small stones (limited)	0.63		
	~slope (slightly limited)	0.16	~slope (slightly limited)	0.16	~too acid (slightly limited)	0.18		
40006:								
Barco-----	Not limited		Not limited		Moderately limited		Not limited	
					~slope (moderately limited)	0.40		
					~depth to bedrock (slightly limited)	0.27		

Table 10.--Recreational Site Development--Continued

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds		Paths and trails	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
40006: Sylvania-----	Slightly limited		Slightly limited		Moderately limited		Not limited	
	~percs slowly (slightly limited)	0.17	~percs slowly (slightly limited)	0.17	~slope (moderately limited)	0.40		
					~percs slowly (slightly limited)	0.17		
40007: Eldorado-----	Limited		Limited		Very limited		Limited	
	~large surface stones (limited)	0.70	~large surface stones (limited)	0.70	~small stones (very limited)	1.00	~large surface stones (limited)	0.70
	~small stones (slightly limited)	0.27	~small stones (slightly limited)	0.27	~slope (limited)	0.98		
					~large stones (slightly limited)	0.18		
40008: Parsons-----	Very limited		Very limited		Very limited		Limited	
	~percs slowly (very limited)	1.00	~percs slowly (very limited)	1.00	~percs slowly (very limited)	1.00	~wetness (limited)	0.99
	~wetness (very limited)	1.00	~wetness (limited)	0.99	~wetness (very limited)	1.00		
44000: Cherokee-----	Very limited		Very limited		Very limited		Limited	
	~percs slowly (very limited)	1.00	~percs slowly (very limited)	1.00	~percs slowly (very limited)	1.00	~wetness (limited)	0.99
	~wetness (very limited)	1.00	~wetness (limited)	0.99	~wetness (very limited)	1.00		
46001: Verdigris-----	Very limited		Moderately limited		Very limited		Moderately limited	
	~flooding (very limited)	1.00	~flooding (moderately limited)	0.60	~flooding (very limited)	1.00	~flooding (moderately limited)	0.60
46002: Hepler-----	Very limited		Slightly limited		Limited		Slightly limited	
	~flooding (very limited)	1.00	~wetness (limited)	0.60	~wetness (limited)	0.97	~wetness (limited)	0.60
	~wetness (limited)	0.97	~percs slowly (slightly limited)	0.17	~flooding (moderately limited)	0.60		
	~percs slowly (slightly limited)	0.17			~percs slowly (slightly limited)	0.17		
66001: Dameron-----	Very limited		Moderately limited		Very limited		Moderately limited	
	~flooding (very limited)	1.00	~flooding (moderately limited)	0.60	~flooding (very limited)	1.00	~flooding (moderately limited)	0.60
70000: Bona-----	Moderately limited		Moderately limited		Very limited		Not limited	
	~small stones (moderately limited)	0.40	~small stones (moderately limited)	0.40	~small stones (very limited)	1.00		
	~percs slowly (slightly limited)	0.13	~percs slowly (slightly limited)	0.13	~slope (limited)	0.78		
					~percs slowly (slightly limited)	0.13		

Table 10.--Recreational Site Development--Continued

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds		Paths and trails	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70006: Crelton-----	Moderately limited		Slightly limited		Moderately limited		Slightly limited	
	~wetness	0.38	~wetness	0.13	~wetness	0.38	~wetness	0.13
	(moderately limited)		(slightly limited)		(moderately limited)		(slightly limited)	
	~percs slowly	0.13	~percs slowly	0.13	~percs slowly	0.13		
	(slightly limited)		(slightly limited)		(slightly limited)			
					~slope	0.10		
					(slightly limited)			
70007: Cliquot-----	Very limited		Very limited		Very limited		Slightly limited	
	~slope	1.00	~slope	1.00	~slope	1.00	~slope	0.08
	(very limited)		(very limited)		(very limited)		(slightly limited)	
	~percs slowly	0.39	~percs slowly	0.39	~small stones	1.00		
	(moderately limited)		(moderately limited)		(very limited)			
	~small stones	0.33	~small stones	0.33	~percs slowly	0.39		
	(moderately limited)		(moderately limited)		(moderately limited)			
70008: Goss-----	Moderately limited		Moderately limited		Very limited		Not limited	
	~small stones	0.36	~small stones	0.36	~small stones	1.00		
	(moderately limited)		(moderately limited)		(very limited)			
					~slope	0.98		
					(limited)			
70009: Goss-----	Moderately limited		Moderately limited		Very limited		Not limited	
	~small stones	0.54	~small stones	0.54	~slope	1.00		
	(moderately limited)		(moderately limited)		(very limited)			
	~slope	0.04	~slope	0.04	~small stones	1.00		
	(slightly limited)		(slightly limited)		(very limited)			
70010: Goss-----	Very limited		Very limited		Very limited		Moderately limited	
	~slope	1.00	~slope	1.00	~slope	1.00	~large stones	0.40
	(very limited)		(very limited)		(very limited)		(moderately limited)	
	~small stones	0.42	~small stones	0.42	~large stones >25%	1.00	~slope	0.33
	(moderately limited)		(moderately limited)		(very limited)		(moderately limited)	
	~large stones	0.40	~large stones	0.40	~small stones	1.00		
	(moderately limited)		(moderately limited)		(very limited)			
70012: Hoberg-----	Limited		Slightly limited		Limited		Slightly limited	
	~wetness	0.60	~wetness	0.28	~wetness	0.60	~wetness	0.28
	(limited)		(slightly limited)		(limited)		(slightly limited)	
					~small stones	0.00		
					(slightly limited)			
70014: Moko-----	Very limited		Very limited		Very limited		Limited	
	~slope	1.00	~slope	1.00	~slope	1.00	~slope	0.92
	(very limited)		(very limited)		(very limited)		(limited)	
	~shallow to bedrock	0.90	~shallow to bedrock	0.90	~bedrock <20 in.	1.00	~too clayey	0.60
	(limited)		(limited)		(very limited)		(moderately limited)	
	~too clayey	0.60	~too clayey	0.60	~small stones	1.00	~large surface stones	0.37
	(moderately limited)		(moderately limited)		(very limited)		(moderately limited)	
Rock outcrop-----	Not rated		Not rated		Not rated		Not rated	

Table 10.--Recreational Site Development--Continued

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds		Paths and trails	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70040: Cliquot-----	Moderately limited		Moderately limited		Moderately limited		Not limited	
	~percs slowly	0.39	~percs slowly	0.39	~percs slowly	0.39		
	(moderately limited)		(moderately limited)		(moderately limited)			
					~slope	0.10		
					(slightly limited)			
					~small stones	0.00		
					(slightly limited)			
Bolivar-----	Not limited		Not limited		Moderately limited		Not limited	
					~depth to bedrock	0.53		
					(moderately limited)			
					~slope	0.10		
					(slightly limited)			
					~small stones	0.00		
					(slightly limited)			
70041: Goss-----	Limited		Limited		Very limited		Not limited	
	~slope	0.96	~slope	0.96	~small stones	1.00		
	(limited)		(limited)		(very limited)			
	~small stones	0.65	~small stones	0.65	~slope	1.00		
	(limited)		(limited)		(very limited)			
					~large stones	0.30		
					(slightly limited)			
70042: Goss-----	Very limited		Very limited		Very limited		Very limited	
	~slope	1.00	~slope	1.00	~small stones	1.00	~small stones	1.00
	(very limited)		(very limited)		(very limited)		(limited)	
	~small stones	1.00	~small stones	1.00	~slope	1.00	~slope	0.58
	(very limited)		(very limited)		(very limited)		(moderately limited)	
	~too acid	0.12	~too acid	0.12	~too acid	0.12		
	(slightly limited)		(slightly limited)		(slightly limited)			
70043: Sonsac-----	Limited		Limited		Very limited		Limited	
	~large stones	0.76	~large stones	0.76	~slope	1.00	~large stones	0.76
	(limited)		(limited)		(very limited)		(limited)	
	~slope	0.37	~slope	0.37	~large stones >25%	1.00		
	(moderately limited)		(moderately limited)		(very limited)			
					~depth to bedrock	0.27		
					(slightly limited)			
Moko-----	Very limited		Very limited		Very limited		Slightly limited	
	~small stones	1.00	~small stones	1.00	~small stones	1.00	~small stones	0.01
	(limited)		(limited)		(very limited)		(slightly limited)	
	~shallow to bedrock	0.90	~shallow to bedrock	0.90	~bedrock <20 in.	1.00		
	(limited)		(limited)		(very limited)			
	~slope	0.37	~slope	0.37	~slope	1.00		
	(moderately limited)		(moderately limited)		(very limited)			
Rock outcrop-----	Not rated		Not rated		Not rated		Not rated	
70044: Sonsac-----	Very limited		Very limited		Very limited		Slightly limited	
	~slope	1.00	~slope	1.00	~slope	1.00	~slope	0.08
	(very limited)		(very limited)		(very limited)		(slightly limited)	
	~small stones	0.33	~small stones	0.33	~small stones	1.00		
	(moderately limited)		(moderately limited)		(very limited)			
					~depth to bedrock	0.09		
					(slightly limited)			

Table 10.--Recreational Site Development--Continued

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds		Paths and trails	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70044: Moko-----	Very limited		Very limited		Very limited		Slightly limited	
	~slope	1.00	~slope	1.00	~slope	1.00	~slope	0.25
	(very limited)		(very limited)		(very limited)		(slightly limited)	
	~shallow to bedrock	0.90	~shallow to bedrock	0.90	~bedrock <20 in.	1.00		
	(limited)		(limited)		(very limited)			
	~small stones	0.82	~small stones	0.82	~small stones	1.00		
	(limited)		(limited)		(very limited)			
70045: Keeno-----	Limited		Slightly limited		Limited		Slightly limited	
	~wetness	0.60	~wetness	0.28	~slope	0.98	~wetness	0.28
	(limited)		(slightly limited)		(limited)		(slightly limited)	
					~wetness	0.60		
					(limited)			
					~large stones	0.30		
					(slightly limited)			
70047: Wanda-----	Not limited		Not limited		Limited		Not limited	
					~slope	0.78		
					(limited)			
					~small stones	0.00		
					(slightly limited)			
70048: Alsup-----	Limited		Limited		Very limited		Very limited	
	~large surface stones	0.70	~large surface stones	0.70	~slope	1.00	~erodes easily	1.00
	(limited)		(limited)		(very limited)		(very limited)	
	~slope	0.16	~slope	0.16	~percs slowly	0.13	~large surface stones	0.70
	(slightly limited)		(slightly limited)		(slightly limited)		(limited)	
	~percs slowly	0.13	~percs slowly	0.13	~small stones	0.00		
	(slightly limited)		(slightly limited)		(slightly limited)			
73000: Pomme-----	Not limited		Not limited		Limited		Not limited	
					~slope	0.98		
					(limited)			
					~small stones	0.30		
					(moderately limited)			
73008: Viraton-----	Limited		Moderately limited		Limited		Moderately limited	
	~wetness	0.85	~wetness	0.49	~wetness	0.85	~wetness	0.49
	(limited)		(moderately limited)		(limited)		(moderately limited)	
					~slope	0.40		
					(moderately limited)			
73010: Wilderness-----	Very limited		Limited		Very limited		Limited	
	~wetness	1.00	~wetness	0.68	~wetness	1.00	~wetness	0.68
	(very limited)		(limited)		(very limited)		(limited)	
	~small stones	0.13	~small stones	0.13	~small stones	1.00		
	(slightly limited)		(slightly limited)		(very limited)			
					~slope	0.10		
					(slightly limited)			
73031: Gerald-----	Very limited		Very limited		Very limited		Limited	
	~percs slowly	1.00	~percs slowly	1.00	~percs slowly	1.00	~wetness	0.60
	(very limited)		(very limited)		(very limited)		(limited)	
	~wetness	0.97	~wetness	0.60	~wetness	0.97		
	(limited)		(limited)		(limited)			

Table 10.--Recreational Site Development--Continued

Map symbol and soil name	Camp areas		Picnic areas		Playgrounds		Paths and trails	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
73059: Pomme-----	Not limited		Not limited		Slightly limited ~slope (slightly limited)	0.10	Not limited	
73065: Wilderness-----	Limited ~large surface stones (limited) ~wetness (limited) ~large stones (moderately limited)	0.70 0.67 0.40	Limited ~large surface stones (limited) ~large stones (moderately limited) ~wetness (moderately limited)	0.70 0.40 0.34	Very limited ~large stones >25% (very limited) ~wetness (limited) ~slope (moderately limited)	1.00 0.67 0.40	Limited ~large surface stones (limited) ~large stones (moderately limited) ~wetness (moderately limited)	0.70 0.40 0.34
73075: Hobson-----	Moderately limited ~wetness (moderately limited) ~too acid (slightly limited)	0.38 0.24	Slightly limited ~too acid (slightly limited) ~wetness (slightly limited)	0.24 0.13	Moderately limited ~wetness (moderately limited) ~too acid (slightly limited)	0.38 0.24	Slightly limited ~wetness (slightly limited)	0.13
74625: Hartville-----	Limited ~wetness (limited) ~percs slowly (moderately limited)	0.85 0.39	Moderately limited ~wetness (moderately limited) ~percs slowly (moderately limited)	0.49 0.39	Limited ~wetness (limited) ~percs slowly (moderately limited) ~slope (slightly limited)	0.85 0.39 0.10	Moderately limited ~wetness (moderately limited)	0.49
74641: Secesh-----	Very limited ~flooding (very limited)	1.00	Not limited		Moderately limited ~flooding (moderately limited) ~small stones (slightly limited)	0.60 0.00	Not limited	
75378: Sturkie-----	Very limited ~flooding (very limited)	1.00	Moderately limited ~flooding (moderately limited)	0.60	Very limited ~flooding (very limited)	1.00	Moderately limited ~flooding (moderately limited)	0.60
99000: Pits, quarries----	Not rated		Not rated		Not rated		Not rated	
99001: Water-----	Not rated		Not rated		Not rated		Not rated	
99004: Kanima-----	Very limited ~slope (very limited) ~small stones (very limited)	1.00 1.00	Very limited ~slope (very limited) ~small stones (very limited)	1.00 1.00	Very limited ~small stones (very limited) ~slope (very limited)	1.00 1.00	Very limited ~slope (very limited) ~small stones (moderately limited)	1.00 0.60

Table 11a.--Wildlife Habitat Suitability

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
15003:										
Basehor-----	Very limited		Very limited		Limited		Very limited		Very limited	
	~droughty	1.00	~bedrock <20 in.	1.00	~droughty	0.90	~bedrock <20 in.	1.00	~bedrock <20 in.	1.00
	(very limited)		(very limited)		(limited)		(very limited)		(very limited)	
	~bedrock <20 in.	1.00	~droughty	0.90			~droughty	0.90	~droughty	0.90
	(very limited)		(limited)				(limited)		(limited)	
	~high erodibility	0.80	~high erodibility	0.80						
	(limited)		(limited)							
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
15004:										
Basehor-----	Very limited		Very limited		Limited		Very limited		Very limited	
	~droughty	1.00	~bedrock <20 in.	1.00	~droughty	0.98	~bedrock <20 in.	1.00	~bedrock <20 in.	1.00
	(very limited)		(very limited)		(limited)		(very limited)		(very limited)	
	~bedrock <20 in.	1.00	~droughty	0.98			~droughty	0.98	~droughty	0.98
	(very limited)		(limited)				(limited)		(limited)	
	~high erodibility	0.80	~high erodibility	0.80						
	(limited)		(limited)							
40000:										
Barden-----	Moderately limited		Moderately limited		Slightly limited		Slightly limited		Moderately limited	
	~moderate erodibility	0.50	~moderate erodibility	0.50	~wetness	0.28	~wetness	0.28	~wetness	0.45
	(moderately limited)		(moderately limited)		(slightly limited)		(slightly limited)		(moderately limited)	
	~percs slowly	0.39	~percs slowly	0.39						
	(moderately limited)		(moderately limited)							
	~wetness	0.28	~wetness	0.28						
	(slightly limited)		(slightly limited)							
40003:										
Woodson-----	Very limited		Very limited		Limited		Limited		Very limited	
	~percs slowly	1.00	~percs slowly	1.00	~wetness	0.81	~wetness	0.81	~wetness	1.00
	(very limited)		(very limited)		(limited)		(limited)		(very limited)	
	~wetness	0.81	~wetness	0.81						
	(limited)		(limited)							
	~moderate erodibility	0.50	~moderate erodibility	0.50						
	(moderately limited)		(moderately limited)							

Table 11a.--Wildlife Habitat Suitability--Continued

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
40004:										
Barden-----	Moderately limited		Moderately limited		Slightly limited		Slightly limited		Moderately limited	
	~moderate erodibility	0.50	~moderate erodibility	0.50	~wetness	0.28	~wetness	0.28	~wetness	0.45
	(moderately limited)		(moderately limited)		(slightly limited)		(slightly limited)		(moderately limited)	
	~percs slowly	0.39	~percs slowly	0.39						
	(moderately limited)		(moderately limited)							
	~wetness	0.28	~wetness	0.28						
	(slightly limited)		(slightly limited)							
40005:										
Sylvania-----	Limited		Limited		Not limited		Not limited		Slightly limited	
	~high erodibility	0.80	~high erodibility	0.80					~wetness	0.22
	(limited)		(limited)						(slightly limited)	
	~percs slowly	0.13	~percs slowly	0.13						
	(slightly limited)		(slightly limited)							
40006:										
Barco-----	Moderately limited		Moderately limited		Not limited		Slightly limited		Slightly limited	
	~moderate erodibility	0.50	~moderate erodibility	0.50			~depth to bedrock	0.27	~depth to bedrock	0.27
	(moderately limited)		(moderately limited)				(slightly limited)		(slightly limited)	
	~depth to bedrock	0.27	~depth to bedrock	0.27						
	(slightly limited)		(slightly limited)							
	~droughty	0.13								
	(slightly limited)									
Sylvania-----	Moderately limited		Moderately limited		Not limited		Not limited		Slightly limited	
	~moderate erodibility	0.50	~moderate erodibility	0.50					~wetness	0.03
	(moderately limited)		(moderately limited)						(slightly limited)	
	~percs slowly	0.17	~percs slowly	0.17						
	(slightly limited)		(slightly limited)							
40007:										
Eldorado-----	Limited		Moderately limited		Slightly limited		Not limited		Not limited	
	~droughty	0.89	~moderate erodibility	0.50	~small stones	0.03				
	(limited)		(moderately limited)		(slightly limited)					
	~moderate erodibility	0.50	~small stones	0.27						
	(moderately limited)		(slightly limited)							
	~small stones	0.27								
	(slightly limited)									

Table 11a.--Wildlife Habitat Suitability--Continued

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
40008:										
Parsons-----	Very limited		Very limited		Limited		Limited		Very limited	
	~percs slowly	1.00	~percs slowly	1.00	~wetness	0.99	~wetness	0.99	~wetness	1.00
	(very limited)		(very limited)		(limited)		(limited)		(very limited)	
	~wetness	0.99	~wetness	0.99						
	(limited)		(limited)							
	~moderate erodibility	0.50	~moderate erodibility	0.50						
	(moderately limited)		(moderately limited)							
44000:										
Cherokee-----	Very limited		Very limited		Limited		Limited		Very limited	
	~percs slowly	1.00	~percs slowly	1.00	~wetness	0.99	~wetness	0.99	~wetness	1.00
	(very limited)		(very limited)		(limited)		(limited)		(very limited)	
	~wetness	0.99	~wetness	0.99						
	(limited)		(limited)							
46001:										
Verdigris-----	Limited		Limited		Not limited		Not limited		Not limited	
	~flooding	0.90	~flooding	0.90						
	(limited)		(limited)							
46002:										
Heppler-----	Moderately limited		Moderately limited		Moderately limited		Moderately limited		Moderately limited	
	~flooding	0.60	~flooding	0.60	~wetness	0.60	~wetness	0.60	~wetness	0.99
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(limited)	
	~wetness	0.60	~wetness	0.60						
	(moderately limited)		(moderately limited)							
	~percs slowly	0.17	~percs slowly	0.17						
	(slightly limited)		(slightly limited)							
66001:										
Dameron-----	Limited		Limited		Not limited		Not limited		Not limited	
	~flooding	0.90	~flooding	0.90						
	(limited)		(limited)							
70000:										
Bona-----	Limited		Moderately limited		Slightly limited		Not limited		Not limited	
	~droughty	1.00	~moderate erodibility	0.50	~small stones	0.06				
	(very limited)		(moderately limited)		(slightly limited)					
	~moderate erodibility	0.50	~small stones	0.40						
	(moderately limited)		(moderately limited)							
	~small stones	0.40	~percs slowly	0.13						
	(moderately limited)		(slightly limited)							

Table 11a.--Wildlife Habitat Suitability--Continued

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70006:										
Credlon-----	Limited		Moderately limited		Moderately limited		Moderately limited		Moderately limited	
	~droughty	0.74	~moderate erodibility	0.50	~wetness	0.36	~wetness	0.36	~wetness	0.51
	(limited)		(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	
	~moderate erodibility	0.50	~wetness	0.36						
	(moderately limited)		(moderately limited)							
	~wetness	0.36	~percs slowly	0.13						
	(moderately limited)		(slightly limited)							
70007:										
Cliquot-----	Limited		Limited		Slightly limited		Not limited		Slightly limited	
	~high erodibility	0.80	~high erodibility	0.80	~small stones	0.04			~wetness	0.12
	(limited)		(limited)		(slightly limited)				(slightly limited)	
	~droughty	0.62	~percs slowly	0.39						
	(limited)		(moderately limited)							
	~percs slowly	0.39	~small stones	0.33						
	(moderately limited)		(moderately limited)							
70008:										
Goss-----	Very limited		Limited		Slightly limited		Slightly limited		Slightly limited	
	~droughty	1.00	~high erodibility	0.80	~droughty	0.13	~droughty	0.13	~droughty	0.13
	(very limited)		(limited)		(slightly limited)		(slightly limited)		(slightly limited)	
	~high erodibility	0.80	~small stones	0.36	~small stones	0.05				
	(limited)		(moderately limited)		(slightly limited)					
	~small stones	0.36	~droughty	0.13						
	(moderately limited)		(slightly limited)							
70009:										
Goss-----	Very limited		Limited		Slightly limited		Slightly limited		Slightly limited	
	~droughty	1.00	~high erodibility	0.80	~droughty	0.19	~droughty	0.19	~droughty	0.19
	(very limited)		(limited)		(slightly limited)		(slightly limited)		(slightly limited)	
	~high erodibility	0.80	~small stones	0.54	~small stones	0.10				
	(limited)		(moderately limited)		(slightly limited)					
	~small stones	0.54	~droughty	0.19						
	(moderately limited)		(slightly limited)							
70010:										
Goss-----	Very limited		Limited		Limited		Limited		Limited	
	~droughty	1.00	~high erodibility	0.80	~droughty	0.72	~droughty	0.72	~droughty	0.72
	(very limited)		(limited)		(limited)		(limited)		(limited)	
	~high erodibility	0.80	~large stones	0.73	~large stones	0.40	~large stones	0.40	~large stones	0.40
	(limited)		(limited)		(moderately limited)		(moderately limited)		(moderately limited)	
	~large stones	0.73	~droughty	0.72	~small stones	0.07				
	(limited)		(limited)		(slightly limited)					

Table 11a.--Wildlife Habitat Suitability--Continued

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70012:										
Hoberg-----	Limited		Moderately limited		Moderately limited		Moderately limited		Moderately limited	
	~droughty	0.63	~moderate erodibility	0.50	~wetness	0.44	~wetness	0.44	~wetness	0.59
	(limited)		(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	
	~moderate erodibility	0.50	~wetness	0.44						
	(moderately limited)		(moderately limited)							
	~wetness	0.44								
	(moderately limited)									
70014:										
Moko-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~droughty	1.00	~droughty	1.00	~droughty	1.00	~droughty	1.00	~droughty	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~bedrock <20 in.	1.00	~bedrock <20 in.	1.00	~too clayey	0.15	~bedrock <20 in.	1.00	~bedrock <20 in.	1.00
	(very limited)		(very limited)		(slightly limited)		(very limited)		(very limited)	
	~high erodibility	0.80	~high erodibility	0.80	~small stones	0.02	~too clayey	0.15		
	(limited)		(limited)		(slightly limited)		(slightly limited)			
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
70040:										
Cliquot-----	Limited		Limited		Not limited		Not limited		Slightly limited	
	~droughty	0.98	~high erodibility	0.80					~wetness	0.01
	(limited)		(limited)						(slightly limited)	
	~high erodibility	0.80	~percs slowly	0.39						
	(limited)		(moderately limited)							
	~percs slowly	0.39								
	(moderately limited)									
Bolivar-----	Very limited		Limited		Moderately limited		Moderately limited		Moderately limited	
	~droughty	1.00	~high erodibility	0.80	~droughty	0.30	~depth to bedrock	0.53	~depth to bedrock	0.53
	(very limited)		(limited)		(moderately limited)		(moderately limited)		(moderately limited)	
	~high erodibility	0.80	~depth to bedrock	0.53			~droughty	0.30	~droughty	0.30
	(limited)		(moderately limited)				(moderately limited)		(moderately limited)	
	~depth to bedrock	0.53	~droughty	0.30						
	(moderately limited)		(moderately limited)							
70041:										
Goss-----	Very limited		Limited		Slightly limited		Slightly limited		Slightly limited	
	~droughty	1.00	~high erodibility	0.80	~small stones	0.13	~droughty	0.10	~droughty	0.10
	(very limited)		(limited)		(slightly limited)		(slightly limited)		(slightly limited)	
	~high erodibility	0.80	~small stones	0.65	~droughty	0.10				
	(limited)		(limited)		(slightly limited)					
	~small stones	0.65	~droughty	0.10						
	(limited)		(slightly limited)							

Table 11a.--Wildlife Habitat Suitability--Continued

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70042:										
Goss-----	Very limited		Very limited		Limited		Limited		Slightly limited	
	~droughty	1.00	~small stones	1.00	~small stones	0.99	~small stones	1.00	~droughty	0.17
	(very limited)		(very limited)		(limited)		(limited)		(slightly limited)	
	~small stones	1.00	~high erodibility	0.80	~droughty	0.17	~droughty	0.17		
	(very limited)		(limited)		(slightly limited)		(slightly limited)			
	~high erodibility	0.80	~slope	0.36						
	(limited)		(moderately limited)							
70043:										
Sonsac-----	Very limited		Very limited		Limited		Limited		Limited	
	~droughty	1.00	~large stones >35%	1.00	~large stones	0.76	~large stones	0.76	~large stones	0.76
	(very limited)		(very limited)		(limited)		(limited)		(limited)	
	~large stones >35%	1.00	~high erodibility	0.80	~droughty	0.37	~droughty	0.37	~droughty	0.37
	(very limited)		(limited)		(moderately limited)		(moderately limited)		(moderately limited)	
	~high erodibility	0.80	~droughty	0.37			~depth to bedrock	0.27	~depth to bedrock	0.27
	(limited)		(moderately limited)				(slightly limited)		(slightly limited)	
Moko-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~droughty	1.00	~droughty	1.00	~droughty	1.00	~droughty	1.00	~droughty	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~bedrock <20 in.	1.00	~bedrock <20 in.	1.00	~small stones	0.24	~bedrock <20 in.	1.00	~bedrock <20 in.	1.00
	(very limited)		(very limited)		(slightly limited)		(very limited)		(very limited)	
	~small stones	1.00	~small stones	1.00			~small stones	0.01		
	(limited)		(limited)				(slightly limited)			
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
70044:										
Sonsac-----	Very limited		Limited		Slightly limited		Slightly limited		Slightly limited	
	~droughty	1.00	~high erodibility	0.80	~droughty	0.07	~depth to bedrock	0.09	~depth to bedrock	0.09
	(very limited)		(limited)		(slightly limited)		(slightly limited)		(slightly limited)	
	~high erodibility	0.80	~small stones	0.33	~small stones	0.04	~droughty	0.07	~droughty	0.07
	(limited)		(moderately limited)		(slightly limited)		(slightly limited)		(slightly limited)	
	~small stones	0.33	~depth to bedrock	0.09						
	(moderately limited)		(slightly limited)							
Moko-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~droughty	1.00	~droughty	1.00	~droughty	1.00	~droughty	1.00	~droughty	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~bedrock <20 in.	1.00	~bedrock <20 in.	1.00	~small stones	0.17	~bedrock <20 in.	1.00	~bedrock <20 in.	1.00
	(very limited)		(very limited)		(slightly limited)		(very limited)		(very limited)	
	~small stones	0.82	~small stones	0.82						
	(limited)		(limited)							

Table 11a.--Wildlife Habitat Suitability--Continued

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70045:										
Keeno-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~droughty	1.00	~droughty	1.00	~droughty	1.00	~droughty	1.00	~droughty	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~moderate erodibility	0.50	~moderate erodibility	0.50	~wetness	0.44	~wetness	0.44	~wetness	0.59
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	
	~wetness	0.44	~wetness	0.44						
	(moderately limited)		(moderately limited)							
70047:										
Wanda-----	Moderately limited		Moderately limited		Not limited		Not limited		Not limited	
	~moderate erodibility	0.50	~moderate erodibility	0.50						
	(moderately limited)		(moderately limited)							
70048:										
Alsup-----	Limited		Limited		Not limited		Not limited		Slightly limited	
	~high erodibility	0.80	~high erodibility	0.80					~wetness	0.22
	(limited)		(limited)						(slightly limited)	
	~droughty	0.30	~percs slowly	0.13						
	(moderately limited)		(slightly limited)							
	~percs slowly	0.13								
	(slightly limited)									
73000:										
Pomme-----	Moderately limited		Moderately limited		Not limited		Not limited		Not limited	
	~moderate erodibility	0.50	~moderate erodibility	0.50						
	(moderately limited)		(moderately limited)							
	~droughty	0.45								
	(moderately limited)									
73008:										
Viraton-----	Limited		Moderately limited		Moderately limited		Moderately limited		Limited	
	~droughty	1.00	~wetness	0.55	~wetness	0.55	~wetness	0.55	~wetness	0.85
	(very limited)		(moderately limited)		(moderately limited)		(moderately limited)		(limited)	
	~wetness	0.55	~moderate erodibility	0.50						
	(moderately limited)		(moderately limited)							
	~moderate erodibility	0.50								
	(moderately limited)									

Table 11a.--Wildlife Habitat Suitability--Continued

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
73010:										
Wilderness-----	Very limited		Limited		Limited		Limited		Very limited	
	~droughty (very limited)	1.00	~droughty (limited)	0.87	~droughty (limited)	0.87	~droughty (limited)	0.87	~wetness (very limited)	1.00
	~high erodibility (limited)	0.80	~high erodibility (limited)	0.80	~wetness (limited)	0.68	~wetness (limited)	0.68	~droughty (limited)	0.87
	~wetness (limited)	0.68	~wetness (limited)	0.68	~small stones (slightly limited)	0.01				
73031:										
Gerald-----	Very limited		Very limited		Moderately limited		Moderately limited		Limited	
	~percs slowly (very limited)	1.00	~percs slowly (very limited)	1.00	~wetness (moderately limited)	0.60	~wetness (moderately limited)	0.60	~wetness (limited)	0.99
	~wetness (moderately limited)	0.60	~wetness (moderately limited)	0.60						
	~moderate erodibility (moderately limited)	0.50	~moderate erodibility (moderately limited)	0.50						
73059:										
Pomme-----	Not limited		Not limited		Not limited		Not limited		Not limited	
73065:										
Wilderness-----	Very limited		Limited		Limited		Limited		Limited	
	~droughty (very limited)	1.00	~large stones (limited)	0.73	~droughty (limited)	0.70	~droughty (limited)	0.70	~droughty (limited)	0.70
	~large stones (limited)	0.73	~droughty (limited)	0.70	~wetness (moderately limited)	0.48	~wetness (moderately limited)	0.48	~wetness (limited)	0.66
	~moderate erodibility (moderately limited)	0.50	~moderate erodibility (moderately limited)	0.50	~large stones (moderately limited)	0.40	~large stones (moderately limited)	0.40	~large stones (moderately limited)	0.40
73075:										
Hobson-----	Very limited		Moderately limited		Moderately limited		Moderately limited		Moderately limited	
	~droughty (very limited)	1.00	~moderate erodibility (moderately limited)	0.50	~wetness (moderately limited)	0.36	~wetness (moderately limited)	0.36	~wetness (moderately limited)	0.51
	~moderate erodibility (moderately limited)	0.50	~wetness (moderately limited)	0.36	~droughty (slightly limited)	0.11	~droughty (slightly limited)	0.11	~droughty (slightly limited)	0.11
	~wetness (moderately limited)	0.36	~droughty (slightly limited)	0.11						

Table 11a.--Wildlife Habitat Suitability--Continued

Map symbol and soil name	Grain and seed crops (for use as food and cover)		Domestic grasses and legumes (for use as food and cover)		Upland wild herbaceous plants		Upland shrubs and vines		Upland deciduous trees	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
74625:										
Hartville-----	Limited		Limited		Moderately limited		Moderately limited		Limited	
	~high erodibility (limited)	0.80	~high erodibility (limited)	0.80	~wetness (moderately limited)	0.55	~wetness (moderately limited)	0.55	~wetness (limited)	0.85
	~wetness (moderately limited)	0.55	~wetness (moderately limited)	0.55						
	~percs slowly (moderately limited)	0.39	~percs slowly (moderately limited)	0.39						
74641:										
Secesh-----	Moderately limited		Moderately limited		Not limited		Not limited		Not limited	
	~flooding (moderately limited)	0.60	~flooding (moderately limited)	0.60						
75378:										
Sturkie-----	Limited		Limited		Not limited		Not limited		Not limited	
	~flooding (limited)	0.90	~flooding (limited)	0.90						
99000:										
Pits, quarries-----	Not rated		Not rated		Not rated		Not rated		Not rated	
99001:										
Water-----	Not rated		Not rated		Not rated		Not rated		Not rated	
99004:										
Kanima-----	Very limited		Very limited		Moderately limited		Moderately limited		Slightly limited	
	~droughty (very limited)	1.00	~small stones (very limited)	1.00	~small stones (moderately limited)	0.60	~small stones (moderately limited)	0.60	~droughty (slightly limited)	0.28
	~small stones (very limited)	1.00	~high erodibility (limited)	0.80	~droughty (slightly limited)	0.28	~droughty (slightly limited)	0.28		
	~high erodibility (limited)	0.80	~slope (limited)	0.76						

Table 11b.--Wildlife Habitat Suitability

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Upland mixed deciduous- conifer trees		Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants		Irrigated freshwater wetland plants	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
15003:										
Basehor-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~bedrock <20 in. (very limited)	1.00	~deep to water (very limited)	1.00	~deep to water (very limited)	1.00	~deep to water (very limited)	1.00	~deep to water (very limited)	1.00
	~droughty (limited)	0.90	~infrequent flooding (limited)	0.80	~droughty (limited)	0.90			~slope (limited)	0.91
									~seepage (limited)	0.79
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
15004:										
Basehor-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~bedrock <20 in. (very limited)	1.00	~deep to water (very limited)	1.00	~deep to water (very limited)	1.00	~deep to water (very limited)	1.00	~slope (very limited)	1.00
	~droughty (limited)	0.98	~infrequent flooding (limited)	0.80	~droughty (limited)	0.98			~deep to water (very limited)	1.00
									~seepage (limited)	0.79
40000:										
Barden-----	Moderately limited		Limited		Not limited		Limited		Not limited	
	~wetness (moderately limited)	0.45	~infrequent flooding (limited)	0.80			~deep to water (limited)	0.60		
			~deep to water (limited)	0.60						
40003:										
Woodson-----	Very limited		Limited		Not limited		Slightly limited		Not limited	
	~wetness (very limited)	1.00	~infrequent flooding (limited)	0.80			~deep to water (slightly limited)	0.15		
			~deep to water (slightly limited)	0.15						
40004:										
Barden-----	Moderately limited		Limited		Not limited		Limited		Moderately limited	
	~wetness (moderately limited)	0.45	~infrequent flooding (limited)	0.80			~deep to water (limited)	0.60	~slope (moderately limited)	0.31
			~deep to water (limited)	0.60						

Table 11b.--Wildlife Habitat Suitability--Continued

Map symbol and soil name	Upland mixed deciduous- conifer trees		Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants		Irrigated freshwater wetland plants	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
40005:										
Sylvania-----	Slightly limited		Very limited		Slightly limited		Very limited		Very limited	
	~wetness	0.22	~deep to water	1.00	~deep to water	0.08	~deep to water	1.00	~slope	1.00
	(slightly limited)		(very limited)		(slightly limited)		(very limited)		(very limited)	
			~infrequent flooding	0.80					~seepage	0.18
			(limited)						(slightly limited)	
									~deep to water	0.08
									(slightly limited)	
40006:										
Barco-----	Slightly limited		Very limited		Very limited		Very limited		Very limited	
	~depth to bedrock	0.27	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00
	(slightly limited)		(very limited)		(very limited)		(very limited)		(very limited)	
			~infrequent flooding	0.80					~seepage	0.45
			(limited)						(moderately limited)	
									~slope	0.31
									(moderately limited)	
Sylvania-----	Slightly limited		Very limited		Slightly limited		Very limited		Moderately limited	
	~wetness	0.03	~deep to water	1.00	~deep to water	0.28	~deep to water	1.00	~slope	0.31
	(slightly limited)		(very limited)		(slightly limited)		(very limited)		(moderately limited)	
			~infrequent flooding	0.80					~deep to water	0.28
			(limited)						(slightly limited)	
									~seepage	0.15
									(slightly limited)	
40007:										
Eldorado-----	Not limited		Very limited		Very limited		Very limited		Very limited	
			~deep to water	1.00	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00
			(very limited)		(very limited)		(very limited)		(very limited)	
			~infrequent flooding	0.80					~slope	0.91
			(limited)						(limited)	
									~seepage	0.45
									(moderately limited)	
40008:										
Parsons-----	Very limited		Limited		Not limited		Slightly limited		Not limited	
	~wetness	1.00	~infrequent flooding	0.80			~deep to water	0.02		
	(very limited)		(limited)				(slightly limited)			
			~deep to water	0.02						
			(slightly limited)							

Table 11b.--Wildlife Habitat Suitability--Continued

Map symbol and soil name	Upland mixed deciduous- conifer trees		Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants		Irrigated freshwater wetland plants	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
44000:										
Cherokee-----	Very limited		Limited		Not limited		Slightly limited		Not limited	
	~wetness	1.00	~infrequent flooding	0.80			~deep to water	0.02		
	(very limited)		(limited)				(slightly limited)			
			~deep to water	0.02						
			(slightly limited)							
46001:										
Verdigris-----	Not limited		Very limited		Very limited		Very limited		Very limited	
			~deep to water	1.00	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00
			(very limited)		(very limited)		(very limited)		(very limited)	
									~seepage	0.45
									(moderately limited)	
46002:										
Heppler-----	Moderately limited		Moderately limited		Not limited		Slightly limited		Slightly limited	
	~wetness	0.99	~infrequent flooding	0.50			~deep to water	0.30	~seepage	0.15
	(limited)		(moderately limited)				(slightly limited)		(slightly limited)	
			~deep to water	0.30						
			(slightly limited)							
66001:										
Dameron-----	Not limited		Very limited		Very limited		Very limited		Very limited	
			~deep to water	1.00	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00
			(very limited)		(very limited)		(very limited)		(very limited)	
									~seepage	0.45
									(moderately limited)	
70000:										
Bona-----	Not limited		Very limited		Very limited		Very limited		Very limited	
			~deep to water	1.00	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00
			(very limited)		(very limited)		(very limited)		(very limited)	
			~infrequent flooding	0.80					~slope	0.66
			(limited)						(limited)	
									~seepage	0.18
									(slightly limited)	
70006:										
Crelton-----	Moderately limited		Limited		Not limited		Moderately limited		Slightly limited	
	~wetness	0.51	~infrequent flooding	0.80			~deep to water	0.53	~seepage	0.18
	(moderately limited)		(limited)				(moderately limited)		(slightly limited)	
			~deep to water	0.53					~slope	0.08
			(moderately limited)						(slightly limited)	

Table 11b.--Wildlife Habitat Suitability--Continued

Map symbol and soil name	Upland mixed deciduous- conifer trees		Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants		Irrigated freshwater wetland plants	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70007:										
Cliquot-----	Slightly limited		Very limited		Slightly limited		Very limited		Very limited	
	~wetness	0.12	~deep to water	1.00	~deep to water	0.19	~deep to water	1.00	~slope	1.00
	(slightly limited)		(very limited)		(slightly limited)		(very limited)		(very limited)	
			~infrequent flooding	0.80					~deep to water	0.19
			(limited)						(slightly limited)	
70008:										
Goss-----	Slightly limited		Very limited		Very limited		Very limited		Very limited	
	~droughty	0.13	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00
	(slightly limited)		(very limited)		(very limited)		(very limited)		(very limited)	
			~infrequent flooding	0.80	~droughty	0.13			~slope	0.91
			(limited)		(slightly limited)				(limited)	
									~seepage	0.45
									(moderately limited)	
70009:										
Goss-----	Slightly limited		Very limited		Very limited		Very limited		Very limited	
	~droughty	0.19	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00	~slope	1.00
	(slightly limited)		(very limited)		(very limited)		(very limited)		(very limited)	
			~infrequent flooding	0.80	~droughty	0.19			~deep to water	1.00
			(limited)		(slightly limited)				(very limited)	
									~seepage	0.45
									(moderately limited)	
70010:										
Goss-----	Limited		Very limited		Very limited		Very limited		Very limited	
	~droughty	0.72	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00	~slope	1.00
	(limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~large stones	0.40	~infrequent flooding	0.80	~droughty	0.72			~deep to water	1.00
	(moderately limited)		(limited)		(limited)				(very limited)	
			~large stones	0.40	~large stones	0.40			~seepage	0.45
			(moderately limited)		(moderately limited)				(moderately limited)	
70012:										
Hoberg-----	Moderately limited		Limited		Not limited		Moderately limited		Moderately limited	
	~wetness	0.59	~infrequent flooding	0.80			~deep to water	0.45	~seepage	0.45
	(moderately limited)		(limited)				(moderately limited)		(moderately limited)	
			~deep to water	0.45						
			(moderately limited)							

Table 11b.--Wildlife Habitat Suitability--Continued

Map symbol and soil name	Upland mixed deciduous- conifer trees		Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants		Irrigated freshwater wetland plants	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70014:										
Moko-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~droughty	1.00	~deep to water	1.00	~droughty	1.00	~deep to water	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~bedrock <20 in.	1.00	~infrequent flooding	0.80	~deep to water	1.00			~deep to water	1.00
	(very limited)		(limited)		(very limited)				(very limited)	
									~seepage	0.45
									(moderately limited)	
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
70040:										
Cliquot-----	Slightly limited		Very limited		Slightly limited		Very limited		Slightly limited	
	~wetness	0.01	~deep to water	1.00	~deep to water	0.30	~deep to water	1.00	~deep to water	0.30
	(slightly limited)		(very limited)		(slightly limited)		(very limited)		(slightly limited)	
			~infrequent flooding	0.80					~slope	0.08
			(limited)						(slightly limited)	
Bolivar-----	Moderately limited		Very limited		Very limited		Very limited		Very limited	
	~depth to bedrock	0.53	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00
	(moderately limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~droughty	0.30	~infrequent flooding	0.80	~droughty	0.30			~seepage	0.45
	(moderately limited)		(limited)		(moderately limited)				(moderately limited)	
									~slope	0.08
									(slightly limited)	
70041:										
Goss-----	Slightly limited		Very limited		Very limited		Very limited		Very limited	
	~droughty	0.10	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00	~slope	1.00
	(slightly limited)		(very limited)		(very limited)		(very limited)		(very limited)	
			~infrequent flooding	0.80	~droughty	0.10			~deep to water	1.00
			(limited)		(slightly limited)				(very limited)	
									~seepage	0.45
									(moderately limited)	
70042:										
Goss-----	Slightly limited		Very limited		Very limited		Very limited		Very limited	
	~droughty	0.17	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00	~slope	1.00
	(slightly limited)		(very limited)		(very limited)		(very limited)		(very limited)	
			~small stones	1.00	~small stones	1.00			~deep to water	1.00
			(limited)		(limited)				(very limited)	
			~infrequent flooding	0.80	~droughty	0.17			~seepage	0.45
			(limited)		(slightly limited)				(moderately limited)	

Table 11b.--Wildlife Habitat Suitability--Continued

Map symbol and soil name	Upland mixed deciduous- conifer trees		Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants		Irrigated freshwater wetland plants	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70043:										
Sonsac-----	Limited		Very limited		Very limited		Very limited		Very limited	
	~large stones	0.76	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00
	(limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~droughty	0.37	~infrequent flooding	0.80	~large stones	0.76			~slope	1.00
	(moderately limited)		(limited)		(limited)				(very limited)	
	~depth to bedrock	0.27	~large stones	0.76	~droughty	0.37			~seepage	0.45
	(slightly limited)		(limited)		(moderately limited)				(moderately limited)	
Moko-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~droughty	1.00	~deep to water	1.00	~droughty	1.00	~deep to water	1.00	~deep to water	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~bedrock <20 in.	1.00	~infrequent flooding	0.80	~deep to water	1.00			~slope	1.00
	(very limited)		(limited)		(very limited)				(very limited)	
			~small stones	0.01	~small stones	0.01			~seepage	0.45
			(slightly limited)		(slightly limited)				(moderately limited)	
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
70044:										
Sonsac-----	Slightly limited		Very limited		Very limited		Very limited		Very limited	
	~depth to bedrock	0.09	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00	~slope	1.00
	(slightly limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~droughty	0.07	~infrequent flooding	0.80	~droughty	0.07			~deep to water	1.00
	(slightly limited)		(limited)		(slightly limited)				(very limited)	
									~seepage	0.45
									(moderately limited)	
Moko-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~droughty	1.00	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~bedrock <20 in.	1.00	~infrequent flooding	0.80	~droughty	1.00			~deep to water	1.00
	(very limited)		(limited)		(very limited)				(very limited)	
									~seepage	0.45
									(moderately limited)	
70045:										
Keeno-----	Very limited		Limited		Very limited		Moderately limited		Limited	
	~droughty	1.00	~infrequent flooding	0.80	~droughty	1.00	~deep to water	0.45	~slope	0.91
	(very limited)		(limited)		(very limited)		(moderately limited)		(limited)	
	~wetness	0.59	~deep to water	0.45					~seepage	0.45
	(moderately limited)		(moderately limited)						(moderately limited)	

Table 11b.--Wildlife Habitat Suitability--Continued

Map symbol and soil name	Upland mixed deciduous- conifer trees		Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants		Irrigated freshwater wetland plants	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70047:										
Wanda-----	Not limited		Very limited		Very limited		Very limited		Very limited	
			~deep to water	1.00	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00
			(very limited)		(very limited)		(very limited)		(very limited)	
			~infrequent flooding	0.80					~slope	0.66
			(limited)						(limited)	
									~seepage	0.45
									(moderately limited)	
70048:										
Alsup-----	Slightly limited		Very limited		Slightly limited		Very limited		Very limited	
	~wetness	0.22	~deep to water	1.00	~deep to water	0.08	~deep to water	1.00	~slope	1.00
	(slightly limited)		(very limited)		(slightly limited)		(very limited)		(very limited)	
			~infrequent flooding	0.80					~seepage	0.18
			(limited)						(slightly limited)	
									~deep to water	0.08
									(slightly limited)	
73000:										
Pomme-----	Not limited		Very limited		Very limited		Very limited		Very limited	
			~deep to water	1.00	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00
			(very limited)		(very limited)		(very limited)		(very limited)	
			~infrequent flooding	0.80					~slope	0.91
			(limited)						(limited)	
									~seepage	0.45
									(moderately limited)	
73008:										
Viraton-----	Limited		Limited		Not limited		Moderately limited		Moderately limited	
	~wetness	0.85	~infrequent flooding	0.80			~deep to water	0.35	~seepage	0.45
	(limited)		(limited)				(moderately limited)		(moderately limited)	
			~deep to water	0.35					~slope	0.31
			(moderately limited)						(moderately limited)	
73010:										
Wilderness-----	Very limited		Limited		Limited		Slightly limited		Moderately limited	
	~wetness	1.00	~infrequent flooding	0.80	~droughty	0.87	~deep to water	0.24	~seepage	0.45
	(very limited)		(limited)		(limited)		(slightly limited)		(moderately limited)	
	~droughty	0.87	~deep to water	0.24					~slope	0.08
	(limited)		(slightly limited)						(slightly limited)	

Table 11b.--Wildlife Habitat Suitability--Continued

Map symbol and soil name	Upland mixed deciduous- conifer trees		Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants		Irrigated freshwater wetland plants	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
73031:										
Gerald-----	Limited		Limited		Not limited		Slightly limited		Not limited	
	~wetness	0.99	~infrequent flooding	0.80			~deep to water	0.30		
	(limited)		(limited)				(slightly limited)			
			~deep to water	0.30						
			(slightly limited)							
73059:										
Pomme-----	Not limited		Very limited		Very limited		Very limited		Very limited	
			~deep to water	1.00	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00
			(very limited)		(very limited)		(very limited)		(very limited)	
			~infrequent flooding	0.80					~seepage	0.45
			(limited)						(moderately limited)	
									~slope	0.08
									(slightly limited)	
73065:										
Wilderness-----	Limited		Limited		Limited		Moderately limited		Moderately limited	
	~droughty	0.70	~infrequent flooding	0.80	~droughty	0.70	~deep to water	0.42	~seepage	0.45
	(limited)		(limited)		(limited)		(moderately limited)		(moderately limited)	
	~wetness	0.66	~deep to water	0.42	~large stones	0.40			~slope	0.31
	(limited)		(moderately limited)		(moderately limited)				(moderately limited)	
	~large stones	0.40	~large stones	0.40						
	(moderately limited)		(moderately limited)							
73075:										
Hobson-----	Moderately limited		Limited		Slightly limited		Moderately limited		Moderately limited	
	~wetness	0.51	~infrequent flooding	0.80	~droughty	0.11	~deep to water	0.53	~seepage	0.45
	(moderately limited)		(limited)		(slightly limited)		(moderately limited)		(moderately limited)	
	~droughty	0.11	~deep to water	0.53						
	(slightly limited)		(moderately limited)							
74625:										
Hartville-----	Limited		Limited		Not limited		Moderately limited		Slightly limited	
	~wetness	0.85	~infrequent flooding	0.80			~deep to water	0.35	~slope	0.08
	(limited)		(limited)				(moderately limited)		(slightly limited)	
			~deep to water	0.35						
			(moderately limited)							
74641:										
Secesh-----	Not limited		Very limited		Very limited		Very limited		Very limited	
			~deep to water	1.00	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00
			(very limited)		(very limited)		(very limited)		(very limited)	
			~infrequent flooding	0.50					~seepage	0.45
			(moderately limited)						(moderately limited)	

Table 11b.--Wildlife Habitat Suitability--Continued

Map symbol and soil name	Upland mixed deciduous- conifer trees		Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants		Irrigated freshwater wetland plants	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
75378:										
Sturkie-----	Not limited		Very limited		Very limited		Very limited		Very limited	
			~deep to water	1.00	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00
			(very limited)		(very limited)		(very limited)		(very limited)	
									~seepage	0.45
									(moderately limited)	
99000:										
Pits,										
quarries-----	Not rated		Not rated		Not rated		Not rated		Not rated	
99001:										
Water-----	Not rated		Not rated		Not rated		Not rated		Not rated	
99004:										
Kanima-----	Slightly limited		Very limited		Very limited		Very limited		Very limited	
	~droughty	0.28	~deep to water	1.00	~deep to water	1.00	~deep to water	1.00	~slope	1.00
	(slightly limited)		(very limited)		(very limited)		(very limited)		(very limited)	
			~infrequent flooding	0.80	~small stones	0.60			~deep to water	1.00
			(limited)		(moderately limited)				(very limited)	
			~small stones	0.60	~droughty	0.28			~seepage	0.45
			(moderately limited)		(slightly limited)				(moderately limited)	

Table 12.--Building Site Development

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
15003:										
Basehor-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~hard bedrock <20"	1.00	~hard bedrock <40"	1.00	~hard bedrock <20"	1.00	~hard bedrock <20"	1.00	~bedrock <20 in.	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
					~slope	0.68			~droughty	0.90
					(limited)				(limited)	
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
15004:										
Basehor-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~hard bedrock <20"	1.00	~hard bedrock <40"	1.00	~hard bedrock <20"	1.00	~hard bedrock <20"	1.00	~bedrock <20 in.	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
									~droughty	0.98
									(limited)	
40000:										
Barden-----	Moderately limited		Very limited		Moderately limited		Very limited		Not limited	
	~shrink-swell	0.45	~wetness	1.00	~shrink-swell	0.45	~low strength	1.00		
	(moderately limited)		(very limited)		(moderately limited)		(very limited)			
			~shrink-swell	0.71			~shrink-swell	0.45		
			(limited)				(moderately limited)			
40003:										
Woodson-----	Very limited		Very limited		Very limited		Very limited		Limited	
	~shrink-swell	1.00	~wetness	1.00	~shrink-swell	1.00	~low strength	1.00	~wetness	0.81
	(very limited)		(very limited)		(very limited)		(very limited)		(limited)	
	~wetness	0.81	~shrink-swell	1.00	~wetness	0.81	~shrink-swell	1.00	~too acid	0.24
	(limited)		(very limited)		(limited)		(very limited)		(slightly limited)	
							~wetness	0.81		
							(limited)			
40004:										
Barden-----	Very limited		Very limited		Very limited		Very limited		Not limited	
	~shrink-swell	1.00	~shrink-swell	1.00	~shrink-swell	1.00	~low strength	1.00		
	(very limited)		(very limited)		(very limited)		(very limited)			
			~wetness	1.00	~slope	0.15	~shrink-swell	1.00		
			(very limited)		(slightly limited)		(very limited)			

Table 12.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
40005:										
Sylvania-----	Very limited		Very limited		Very limited		Very limited		Moderately limited	
	~shrink-swell	1.00	~shrink-swell	1.00	~slope	1.00	~low strength	1.00	~too acid	0.48
	(very limited)		(very limited)		(very limited)		(very limited)		(moderately limited)	
	~slope	0.60	~wetness	0.90	~shrink-swell	1.00	~shrink-swell	1.00	~slope	0.16
	(moderately limited)		(limited)		(very limited)		(very limited)		(slightly limited)	
			~slope	0.60			~slope	0.16		
			(moderately limited)				(slightly limited)			
40006:										
Barco-----	Moderately limited		Moderately limited		Moderately limited		Limited		Slightly limited	
	~shrink-swell	0.45	~soft bedrock	0.35	~shrink-swell	0.45	~low strength	0.78	~depth to bedrock	0.27
	(moderately limited)		(moderately limited)		(moderately limited)		(limited)		(slightly limited)	
			~shrink-swell	0.27	~slope	0.15	~shrink-swell	0.45	~too acid	0.24
			(slightly limited)		(slightly limited)		(moderately limited)		(slightly limited)	
Sylvania-----	Very limited		Limited		Very limited		Very limited		Slightly limited	
	~shrink-swell	1.00	~shrink-swell	0.69	~shrink-swell	1.00	~low strength	1.00	~too acid	0.24
	(very limited)		(limited)		(very limited)		(very limited)		(slightly limited)	
			~wetness	0.64	~slope	0.15	~shrink-swell	1.00		
			(limited)		(slightly limited)		(very limited)			
40007:										
Eldorado-----	Moderately limited		Moderately limited		Limited		Moderately limited		Slightly limited	
	~shrink-swell	0.45	~shrink-swell	0.39	~slope	0.68	~shrink-swell	0.45	~small stones	0.27
	(moderately limited)		(moderately limited)		(limited)		(moderately limited)		(slightly limited)	
	~large stones	0.30	~large stones	0.30	~shrink-swell	0.45	~large stones	0.30	~large stones	0.19
	(slightly limited)		(slightly limited)		(moderately limited)		(slightly limited)		(slightly limited)	
					~large stones	0.30				
					(slightly limited)					
40008:										
Parsons-----	Very limited		Very limited		Very limited		Very limited		Limited	
	~shrink-swell	1.00	~wetness	1.00	~shrink-swell	1.00	~low strength	1.00	~wetness	0.99
	(very limited)		(very limited)		(very limited)		(very limited)		(limited)	
	~wetness	0.99	~shrink-swell	1.00	~wetness	0.99	~shrink-swell	1.00		
	(limited)		(very limited)		(limited)		(very limited)			
							~wetness	0.99		
							(limited)			
44000:										
Cherokee-----	Very limited		Very limited		Very limited		Very limited		Limited	
	~shrink-swell	1.00	~wetness	1.00	~shrink-swell	1.00	~low strength	1.00	~wetness	0.99
	(very limited)		(very limited)		(very limited)		(very limited)		(limited)	
	~wetness	0.99	~shrink-swell	1.00	~wetness	0.99	~shrink-swell	1.00		
	(limited)		(very limited)		(limited)		(very limited)			
							~wetness	0.99		
							(limited)			

Table 12.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>
46001:										
Verdigris-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~flooding	1.00	~flooding	1.00	~flooding	1.00	~flooding	1.00	~flooding	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~shrink-swell	0.45	~shrink-swell	0.27	~shrink-swell	0.45	~low strength	1.00		
	(moderately limited)		(slightly limited)		(moderately limited)		(very limited)			
							~shrink-swell	0.45		
							(moderately limited)			
46002:										
Hepler-----	Very limited		Very limited		Very limited		Very limited		Limited	
	~flooding	1.00	~flooding	1.00	~flooding	1.00	~low strength	1.00	~wetness	0.60
	(very limited)		(very limited)		(very limited)		(very limited)		(limited)	
	~wetness	0.60	~wetness	1.00	~wetness	0.60	~flooding	1.00	~flooding	0.60
	(limited)		(very limited)		(limited)		(very limited)		(moderately limited)	
	~shrink-swell	0.45	~shrink-swell	0.33	~shrink-swell	0.45	~wetness	0.60		
	(moderately limited)		(moderately limited)		(moderately limited)		(limited)			
66001:										
Dameron-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~flooding	1.00	~flooding	1.00	~flooding	1.00	~flooding	1.00	~flooding	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~shrink-swell	0.45	~shrink-swell	0.29	~shrink-swell	0.45	~low strength	1.00		
	(moderately limited)		(slightly limited)		(moderately limited)		(very limited)			
							~shrink-swell	0.45		
							(moderately limited)			
70000:										
Bona-----	Moderately limited		Slightly limited		Moderately limited		Very limited		Moderately limited	
	~shrink-swell	0.45	~shrink-swell	0.30	~slope	0.45	~low strength	1.00	~small stones	0.40
	(moderately limited)		(slightly limited)		(moderately limited)		(very limited)		(moderately limited)	
					~shrink-swell	0.45	~shrink-swell	0.45		
					(moderately limited)		(moderately limited)			
70006:										
Credon-----	Moderately limited		Very limited		Moderately limited		Very limited		Slightly limited	
	~shrink-swell	0.45	~wetness	1.00	~shrink-swell	0.45	~low strength	1.00	~wetness	0.13
	(moderately limited)		(very limited)		(moderately limited)		(very limited)		(slightly limited)	
	~wetness	0.13	~shrink-swell	0.45	~wetness	0.13	~shrink-swell	0.45		
	(slightly limited)		(moderately limited)		(slightly limited)		(moderately limited)			
							~wetness	0.13		
							(slightly limited)			

Table 12.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>
70007:										
Cliquot-----	Limited		Limited		Very limited		Very limited		Very limited	
	~slope	0.99	~slope	0.99	~slope	1.00	~slope	1.00	~slope	1.00
	(limited)		(limited)		(very limited)		(very limited)		(very limited)	
			~wetness	0.78					~small stones	0.33
			(limited)						(moderately limited)	
			~shrink-swell	0.74						
			(limited)							
70008:										
Goss-----	Moderately limited		Moderately limited		Limited		Very limited		Moderately limited	
	~shrink-swell	0.45	~shrink-swell	0.45	~slope	0.68	~low strength	1.00	~small stones	0.36
	(moderately limited)		(moderately limited)		(limited)		(very limited)		(moderately limited)	
					~shrink-swell	0.45	~shrink-swell	0.45	~droughty	0.13
					(moderately limited)		(moderately limited)		(slightly limited)	
70009:										
Goss-----	Moderately limited		Moderately limited		Very limited		Very limited		Moderately limited	
	~slope	0.45	~slope	0.45	~slope	1.00	~low strength	1.00	~small stones	0.54
	(moderately limited)		(moderately limited)		(very limited)		(very limited)		(moderately limited)	
	~shrink-swell	0.45	~large stones	0.41	~shrink-swell	0.45	~shrink-swell	0.45	~droughty	0.19
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(slightly limited)	
	~large stones	0.41	~shrink-swell	0.33	~large stones	0.41	~large stones	0.41	~slope	0.04
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(slightly limited)	
70010:										
Goss-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~shrink-swell	0.45	~large stones	0.38	~shrink-swell	0.45	~shrink-swell	0.45	~large stones >30%	1.00
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(very limited)	
	~large stones	0.38	~shrink-swell	0.25	~large stones	0.38	~large stones	0.38	~droughty	0.72
	(moderately limited)		(slightly limited)		(moderately limited)		(moderately limited)		(limited)	
70012:										
Hoberg-----	Slightly limited		Very limited		Slightly limited		Very limited		Slightly limited	
	~wetness	0.28	~wetness	1.00	~wetness	0.28	~low strength	1.00	~wetness	0.28
	(slightly limited)		(very limited)		(slightly limited)		(very limited)		(slightly limited)	
							~wetness	0.28		
							(slightly limited)			

Table 12.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70014:										
Moko-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~hard bedrock <20"	1.00	~hard bedrock <40"	1.00	~slope	1.00	~slope	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~slope	1.00	~slope	1.00	~hard bedrock <20"	1.00	~hard bedrock <20"	1.00	~droughty	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~large stones	0.99	~large stones	0.99	~large stones	0.99	~large stones	0.99	~bedrock <20 in.	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
70040:										
Cliquot-----	Very limited		Limited		Very limited		Very limited		Slightly limited	
	~shrink-swell	1.00	~shrink-swell	0.97	~shrink-swell	1.00	~low strength	1.00	~too acid	0.12
	(very limited)		(limited)		(very limited)		(very limited)		(slightly limited)	
			~wetness	0.61			~shrink-swell	1.00		
			(limited)				(very limited)			
Bolivar-----	Slightly limited		Limited		Slightly limited		Slightly limited		Moderately limited	
	~large stones	0.02	~soft bedrock	0.79	~large stones	0.02	~low strength	0.22	~depth to bedrock	0.53
	(slightly limited)		(limited)		(slightly limited)		(slightly limited)		(moderately limited)	
			~large stones	0.02			~large stones	0.02	~droughty	0.30
			(slightly limited)				(slightly limited)		(moderately limited)	
									~too acid	0.18
									(slightly limited)	
70041:										
Goss-----	Limited		Limited		Very limited		Very limited		Limited	
	~slope	0.91	~slope	0.91	~slope	1.00	~low strength	1.00	~slope	0.96
	(limited)		(limited)		(very limited)		(very limited)		(limited)	
	~shrink-swell	0.45	~shrink-swell	0.23	~shrink-swell	0.45	~slope	0.96	~small stones	0.65
	(moderately limited)		(slightly limited)		(moderately limited)		(limited)		(limited)	
	~large stones	0.19	~large stones	0.19	~large stones	0.19	~shrink-swell	0.45	~large stones	0.30
	(slightly limited)		(slightly limited)		(slightly limited)		(moderately limited)		(moderately limited)	
70042:										
Goss-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~shrink-swell	0.45	~shrink-swell	0.33	~shrink-swell	0.45	~shrink-swell	0.45	~small stones	1.00
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(very limited)	
									~too acid	0.42
									(moderately limited)	

Table 12.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70043:										
Sonsac-----	Limited		Very limited		Very limited		Very limited		Very limited	
	~large stones	0.96	~hard bedrock <40"	1.00	~slope	1.00	~low strength	1.00	~large stones >30%	1.00
	(limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~slope	0.68	~large stones	0.96	~large stones	0.96	~large stones	0.96	~slope	0.37
	(limited)		(limited)		(limited)		(limited)		(moderately limited)	
	~shrink-swell	0.45	~slope	0.68	~shrink-swell	0.45	~shrink-swell	0.45	~droughty	0.37
	(moderately limited)		(limited)		(moderately limited)		(moderately limited)		(moderately limited)	
Moko-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~hard bedrock <20"	1.00	~hard bedrock <40"	1.00	~hard bedrock <20"	1.00	~hard bedrock <20"	1.00	~droughty	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~slope	0.68	~slope	0.68	~slope	1.00	~slope	0.37	~bedrock <20 in.	1.00
	(limited)		(limited)		(very limited)		(moderately limited)		(very limited)	
									~small stones	1.00
									(limited)	
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
70044:										
Sonsac-----	Limited		Very limited		Very limited		Very limited		Very limited	
	~slope	0.99	~hard bedrock <40"	1.00	~slope	1.00	~slope	1.00	~slope	1.00
	(limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~shrink-swell	0.45	~slope	0.99	~shrink-swell	0.45	~low strength	1.00	~small stones	0.33
	(moderately limited)		(limited)		(moderately limited)		(very limited)		(moderately limited)	
	~hard bedrock	0.18	~shrink-swell	0.35	~depth to bedrock	0.18	~shrink-swell	0.45	~depth to bedrock	0.09
	(slightly limited)		(moderately limited)		(slightly limited)		(moderately limited)		(slightly limited)	
Moko-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~hard bedrock <20"	1.00	~hard bedrock <40"	1.00	~slope	1.00	~slope	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~slope	1.00	~slope	1.00	~hard bedrock <20"	1.00	~hard bedrock <20"	1.00	~droughty	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
									~bedrock <20 in.	1.00
									(very limited)	
70045:										
Keeno-----	Slightly limited		Very limited		Limited		Slightly limited		Very limited	
	~wetness	0.28	~wetness	1.00	~slope	0.68	~wetness	0.28	~droughty	1.00
	(slightly limited)		(very limited)		(limited)		(slightly limited)		(very limited)	
	~large stones	0.00	~large stones	0.00	~wetness	0.28	~large stones	0.00	~large stones	0.30
	(slightly limited)		(slightly limited)		(slightly limited)		(slightly limited)		(moderately limited)	
					~large stones	0.00			~wetness	0.28
					(slightly limited)				(slightly limited)	

Table 12.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70047:										
Wanda-----	Moderately limited		Moderately limited		Moderately limited		Moderately limited		Not limited	
	~shrink-swell	0.45	~shrink-swell	0.36	~slope	0.45	~shrink-swell	0.45		
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)			
					~shrink-swell	0.45	~low strength	0.22		
					(moderately limited)		(slightly limited)			
70048:										
Alsup-----	Very limited		Very limited		Very limited		Very limited		Slightly limited	
	~shrink-swell	1.00	~shrink-swell	1.00	~slope	1.00	~low strength	1.00	~too acid	0.24
	(very limited)		(very limited)		(very limited)		(very limited)		(slightly limited)	
	~slope	0.60	~wetness	0.90	~shrink-swell	1.00	~shrink-swell	1.00	~slope	0.16
	(moderately limited)		(limited)		(very limited)		(very limited)		(slightly limited)	
			~slope	0.60			~slope	0.16		
			(moderately limited)				(slightly limited)			
73000:										
Pomme-----	Not limited		Not limited		Limited		Not limited		Not limited	
					~slope	0.68				
					(limited)					
73008:										
Viraton-----	Moderately limited		Very limited		Moderately limited		Very limited		Moderately limited	
	~wetness	0.49	~wetness	1.00	~wetness	0.49	~low strength	1.00	~wetness	0.49
	(moderately limited)		(very limited)		(moderately limited)		(very limited)		(moderately limited)	
					~slope	0.15	~wetness	0.49		
					(slightly limited)		(moderately limited)			
73010:										
Wilderness-----	Limited		Very limited		Limited		Limited		Limited	
	~wetness	0.68	~wetness	1.00	~wetness	0.68	~wetness	0.68	~droughty	0.87
	(limited)		(very limited)		(limited)		(limited)		(limited)	
									~wetness	0.68
									(limited)	
									~small stones	0.13
									(slightly limited)	
73031:										
Gerald-----	Limited		Very limited		Limited		Very limited		Limited	
	~wetness	0.60	~wetness	1.00	~wetness	0.60	~low strength	1.00	~wetness	0.60
	(limited)		(very limited)		(limited)		(very limited)		(limited)	
							~wetness	0.60		
							(limited)			

Table 12.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
73059:										
Pomme-----	Not limited		Not limited		Not limited		Not limited		Not limited	
73065:										
Wilderness-----	Moderately limited		Very limited		Moderately limited		Moderately limited		Very limited	
	~wetness	0.34	~wetness	1.00	~wetness	0.34	~wetness	0.34	~large stones >30%	1.00
	(moderately limited)		(very limited)		(moderately limited)		(moderately limited)		(very limited)	
	~large stones	0.00	~large stones	0.00	~slope	0.15	~large stones	0.00	~droughty	0.70
	(slightly limited)		(slightly limited)		(slightly limited)		(slightly limited)		(limited)	
					~large stones	0.00			~wetness	0.34
					(slightly limited)				(moderately limited)	
73075:										
Hobson-----	Moderately limited		Very limited		Moderately limited		Moderately limited		Moderately limited	
	~shrink-swell	0.45	~wetness	1.00	~shrink-swell	0.45	~shrink-swell	0.45	~too acid	0.54
	(moderately limited)		(very limited)		(moderately limited)		(moderately limited)		(moderately limited)	
	~wetness	0.13	~shrink-swell	0.45	~wetness	0.13	~wetness	0.13	~wetness	0.13
	(slightly limited)		(moderately limited)		(slightly limited)		(slightly limited)		(slightly limited)	
									~droughty	0.11
									(slightly limited)	
74625:										
Hartville-----	Moderately limited		Very limited		Moderately limited		Very limited		Moderately limited	
	~wetness	0.49	~wetness	1.00	~wetness	0.49	~low strength	1.00	~wetness	0.49
	(moderately limited)		(very limited)		(moderately limited)		(very limited)		(moderately limited)	
	~shrink-swell	0.45	~shrink-swell	1.00	~shrink-swell	0.45	~wetness	0.49		
	(moderately limited)		(very limited)		(moderately limited)		(moderately limited)			
							~shrink-swell	0.45		
							(moderately limited)			
74641:										
Secesh-----	Very limited		Very limited		Very limited		Very limited		Moderately limited	
	~flooding	1.00	~flooding	1.00	~flooding	1.00	~flooding	1.00	~flooding	0.60
	(very limited)		(very limited)		(very limited)		(very limited)		(moderately limited)	
75378:										
Sturkie-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~flooding	1.00	~flooding	1.00	~flooding	1.00	~flooding	1.00	~flooding	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
							~low strength	1.00		
							(very limited)			

Table 12.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>
99000:										
Pits,										
quarries-----	Not rated		Not rated		Not rated		Not rated		Not rated	
99001:										
Water-----	Not rated		Not rated		Not rated		Not rated		Not rated	
99004:										
Kanima-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
									~small stones	1.00
									(very limited)	
									~droughty	0.28
									(slightly limited)	

Table 13.--Sanitary Facilities

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Septic tank absorption field		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
15003:										
Basehor-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~depth to bedrock	1.00	~depth to bedrock	1.00	~depth to bedrock	1.00	~depth to bedrock	1.00	~depth to bedrock	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
			~slope	0.91	~seepage	0.79			~seepage	0.50
			(limited)		(limited)				(moderately limited)	
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
15004:										
Basehor-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~depth to bedrock	1.00	~slope	1.00	~depth to bedrock	1.00	~depth to bedrock	1.00	~depth to bedrock	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~slope	1.00	~depth to bedrock	1.00	~slope	1.00	~slope	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
					~seepage	0.79			~seepage	0.50
					(limited)				(moderately limited)	
40000:										
Barden-----	Very limited		Very limited		Limited		Limited		Moderately limited	
	~wetness	1.00	~wetness	1.00	~wetness	0.79	~wetness	0.60	~wetness	0.40
	(very limited)		(very limited)		(limited)		(limited)		(moderately limited)	
	~percs slowly	0.96			~too clayey	0.60			~too clayey	0.30
	(limited)				(moderately limited)				(moderately limited)	
40003:										
Woodson-----	Very limited		Very limited		Very limited		Very limited		Limited	
	~wetness	1.00	~wetness	1.00	~wetness	1.00	~wetness	1.00	~wetness	0.81
	(very limited)		(very limited)		(very limited)		(very limited)		(limited)	
	~percs slowly	1.00			~too clayey	0.87			~too clayey	0.74
	(very limited)				(limited)				(limited)	
									~hard to pack	0.70
									(limited)	

Table 13.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption field		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
40004:										
Barden-----	Very limited		Very limited		Limited		Limited		Limited	
	~wetness	1.00	~wetness	1.00	~wetness	0.79	~wetness	0.60	~hard to pack	0.70
	(very limited)		(very limited)		(limited)		(limited)		(limited)	
	~percs slowly	0.93	~slope	0.31	~too clayey	0.62			~wetness	0.40
	(limited)		(moderately limited)		(limited)				(moderately limited)	
									~too clayey	0.34
									(moderately limited)	
40005:										
Sylvania-----	Limited		Very limited		Very limited		Limited		Limited	
	~wetness	0.89	~wetness	1.00	~depth to bedrock	1.00	~depth to bedrock	0.60	~too clayey	0.90
	(limited)		(very limited)		(very limited)		(limited)		(limited)	
	~depth to bedrock	0.79	~slope	1.00	~too clayey	0.95	~wetness	0.22	~hard to pack	0.70
	(limited)		(very limited)		(limited)		(slightly limited)		(limited)	
	~percs slowly	0.71	~depth to bedrock	0.79	~wetness	0.52	~slope	0.16	~depth to bedrock	0.60
	(limited)		(limited)		(moderately limited)		(slightly limited)		(limited)	
40006:										
Barco-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~depth to bedrock	1.00	~depth to bedrock	1.00	~depth to bedrock	1.00	~depth to bedrock	1.00	~depth to bedrock	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~percs slowly	0.25	~seepage	0.50	~too acid	0.48			~too acid	0.48
	(slightly limited)		(moderately limited)		(moderately limited)				(moderately limited)	
			~slope	0.31	~too clayey	0.14			~too clayey	0.02
			(moderately limited)		(slightly limited)				(slightly limited)	
Sylvania-----	Limited		Limited		Very limited		Moderately limited		Moderately limited	
	~percs slowly	0.74	~wetness	0.78	~depth to bedrock	1.00	~depth to bedrock	0.48	~depth to bedrock	0.48
	(limited)		(limited)		(very limited)		(moderately limited)		(moderately limited)	
	~depth to bedrock	0.64	~depth to bedrock	0.64	~too clayey	0.55	~wetness	0.02	~too acid	0.36
	(limited)		(limited)		(moderately limited)		(slightly limited)		(moderately limited)	
	~wetness	0.63	~slope	0.31	~too acid	0.36			~too clayey	0.28
	(limited)		(moderately limited)		(moderately limited)				(slightly limited)	
40007:										
Eldorado-----	Slightly limited		Limited		Very limited		Not limited		Very limited	
	~large stones	0.30	~slope	0.91	~too clayey	1.00			~too clayey	1.00
	(slightly limited)		(limited)		(very limited)				(very limited)	
	~percs slowly	0.25	~seepage	0.50	~large stones	0.64			~large stones	0.33
	(slightly limited)		(moderately limited)		(limited)				(moderately limited)	
			~large stones	0.08					~small stones	0.11
			(slightly limited)						(slightly limited)	

Table 13.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption field		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
40008:										
Parsons-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~wetness	1.00	~wetness	1.00	~wetness	1.00	~wetness	1.00	~too clayey	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~percs slowly	1.00			~too clayey	1.00			~wetness	0.99
	(very limited)				(very limited)				(limited)	
					~too acid	0.06			~hard to pack	0.70
					(slightly limited)				(limited)	
44000:										
Cherokee-----	Very limited		Very limited		Very limited		Very limited		Limited	
	~wetness	1.00	~wetness	1.00	~wetness	1.00	~wetness	1.00	~wetness	0.99
	(very limited)		(very limited)		(very limited)		(very limited)		(limited)	
	~percs slowly	1.00			~too clayey	0.98			~too clayey	0.95
	(very limited)				(limited)				(limited)	
					~too acid	0.24			~hard to pack	0.70
					(slightly limited)				(limited)	
46001:										
Verdigris-----	Very limited		Very limited		Very limited		Very limited		Not limited	
	~flooding	1.00	~flooding	1.00	~flooding	1.00	~flooding	1.00		
	(very limited)		(very limited)		(very limited)		(very limited)			
	~percs slowly	0.25	~seepage	0.50						
	(slightly limited)		(moderately limited)							
46002:										
Hepler-----	Very limited		Very limited		Very limited		Very limited		Moderately limited	
	~flooding	1.00	~flooding	1.00	~flooding	1.00	~flooding	1.00	~wetness	0.60
	(very limited)		(very limited)		(very limited)		(very limited)		(moderately limited)	
	~wetness	1.00	~wetness	1.00	~wetness	1.00	~wetness	0.99		
	(very limited)		(very limited)		(very limited)		(limited)			
	~percs slowly	0.74								
	(limited)									
66001:										
Dameron-----	Very limited		Very limited		Very limited		Very limited		Slightly limited	
	~flooding	1.00	~flooding	1.00	~flooding	1.00	~flooding	1.00	~too clayey	0.10
	(very limited)		(very limited)		(very limited)		(very limited)		(slightly limited)	
	~percs slowly	0.25	~seepage	0.50	~too clayey	0.24				
	(slightly limited)		(moderately limited)		(slightly limited)					

Table 13.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption field		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70000:										
Bona-----	Very limited		Limited		Very limited		Not limited		Very limited	
	~percs slowly	1.00	~slope	0.66	~too clayey	1.00			~too clayey	1.00
	(very limited)		(limited)		(very limited)				(very limited)	
			~seepage	0.50	~too acid	0.36			~hard to pack	0.70
			(moderately limited)		(moderately limited)				(limited)	
									~too acid	0.36
									(moderately limited)	
70006:										
Credon-----	Very limited		Very limited		Very limited		Limited		Very limited	
	~wetness	1.00	~wetness	1.00	~too clayey	1.00	~wetness	0.69	~too clayey	1.00
	(very limited)		(very limited)		(very limited)		(limited)		(very limited)	
	~percs slowly	0.71	~seepage	0.50	~wetness	0.89			~wetness	0.45
	(limited)		(moderately limited)		(limited)				(moderately limited)	
			~slope	0.08						
			(slightly limited)							
70007:										
Cliquot-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~slope	1.00	~slope	1.00	~depth to bedrock	1.00	~slope	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~percs slowly	0.93	~wetness	0.98	~slope	1.00	~depth to bedrock	0.30	~too clayey	0.49
	(limited)		(limited)		(very limited)		(slightly limited)		(moderately limited)	
	~wetness	0.75	~seepage	0.50	~too clayey	0.72	~wetness	0.12	~too acid	0.48
	(limited)		(moderately limited)		(limited)		(slightly limited)		(moderately limited)	
70008:										
Goss-----	Slightly limited		Limited		Very limited		Not limited		Very limited	
	~percs slowly	0.25	~slope	0.91	~too clayey	1.00			~too clayey	1.00
	(slightly limited)		(limited)		(very limited)				(very limited)	
			~seepage	0.50					~small stones	0.88
			(moderately limited)						(limited)	
									~hard to pack	0.70
									(limited)	
70009:										
Goss-----	Moderately limited		Very limited		Very limited		Slightly limited		Very limited	
	~large stones	0.41	~slope	1.00	~too clayey	1.00	~slope	0.04	~too clayey	1.00
	(moderately limited)		(very limited)		(very limited)		(slightly limited)		(very limited)	
	~percs slowly	0.25	~seepage	0.50	~large stones	0.60			~too acid	0.54
	(slightly limited)		(moderately limited)		(moderately limited)				(moderately limited)	
	~slope	0.04	~large stones	0.30	~too acid	0.54			~small stones	0.33
	(slightly limited)		(slightly limited)		(moderately limited)				(moderately limited)	

Table 13.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption field		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70010:										
Goss-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~large stones	0.38	~seepage	1.00	~too clayey	0.97	~seepage	0.75	~too clayey	0.93
	(moderately limited)		(very limited)		(limited)		(limited)		(limited)	
	~percs slowly	0.25	~large stones	1.00	~large stones	0.31			~small stones	0.71
	(slightly limited)		(very limited)		(moderately limited)				(limited)	
70012:										
Hoberg-----	Very limited		Very limited		Limited		Limited		Moderately limited	
	~wetness	1.00	~wetness	1.00	~wetness	0.99	~wetness	0.80	~too clayey	0.57
	(very limited)		(very limited)		(limited)		(limited)		(moderately limited)	
	~percs slowly	0.25	~seepage	0.50	~too clayey	0.78			~wetness	0.50
	(slightly limited)		(moderately limited)		(limited)				(moderately limited)	
					~large stones	0.05				
					(slightly limited)					
70014:										
Moko-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~depth to bedrock	1.00	~slope	1.00	~slope	1.00	~depth to bedrock	1.00	~depth to bedrock	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~slope	1.00	~depth to bedrock	1.00	~depth to bedrock	1.00	~slope	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~large stones	0.99	~large stones	0.95	~too clayey	0.29			~large stones	0.99
	(very limited)		(limited)		(slightly limited)				(limited)	
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
70040:										
Cliquot-----	Limited		Limited		Very limited		Limited		Very limited	
	~depth to bedrock	0.94	~depth to bedrock	0.94	~depth to bedrock	1.00	~depth to bedrock	0.90	~too clayey	1.00
	(limited)		(limited)		(very limited)		(limited)		(very limited)	
	~percs slowly	0.93	~wetness	0.71	~too clayey	1.00			~depth to bedrock	0.90
	(limited)		(limited)		(very limited)				(limited)	
	~wetness	0.60	~slope	0.08	~too acid	0.54			~hard to pack	0.70
	(moderately limited)		(slightly limited)		(moderately limited)				(limited)	
Bolivar-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~depth to bedrock	1.00	~depth to bedrock	1.00	~depth to bedrock	1.00	~depth to bedrock	1.00	~depth to bedrock	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~percs slowly	0.25	~seepage	0.50	~too acid	0.24			~too acid	0.24
	(slightly limited)		(moderately limited)		(slightly limited)				(slightly limited)	
	~large stones	0.02	~slope	0.08	~too clayey	0.17			~too clayey	0.05
	(slightly limited)		(slightly limited)		(slightly limited)				(slightly limited)	

Table 13.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption field		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70041:										
Goss-----	Limited		Very limited		Very limited		Limited		Very limited	
	~slope	0.96	~slope	1.00	~too clayey	1.00	~slope	0.96	~too clayey	1.00
	| (limited)		| (very limited)		| (very limited)		| (limited)		| (very limited)	
	~percs slowly	0.25	~seepage	1.00	~slope	0.96	~seepage	0.75	~slope	0.96
	| (slightly limited)		| (very limited)		| (limited)		| (limited)		| (limited)	
	~large stones	0.19	~large stones	0.09	~large stones	0.41			~hard to pack	0.70
	| (slightly limited)		| (slightly limited)		| (moderately limited)				| (limited)	
70042:										
Goss-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00
	| (very limited)		| (very limited)		| (very limited)		| (very limited)		| (very limited)	
	~percs slowly	0.25	~seepage	0.50	~too clayey	1.00			~small stones >35%	1.00
	| (slightly limited)		| (moderately limited)		| (very limited)				| (very limited)	
					~too acid	0.36			~too clayey	1.00
					| (moderately limited)				| (very limited)	
70043:										
Sonsac-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~depth to bedrock	1.00	~depth to bedrock	1.00	~depth to bedrock	1.00	~depth to bedrock	1.00	~depth to bedrock	1.00
	| (very limited)		| (very limited)		| (very limited)		| (very limited)		| (very limited)	
	~large stones	0.96	~slope	1.00	~too clayey	1.00	~slope	0.37	~too clayey	0.99
	| (limited)		| (very limited)		| (limited)		| (moderately limited)		| (limited)	
	~slope	0.37	~large stones	1.00	~slope	0.37			~large stones	0.95
	| (moderately limited)		| (very limited)		| (moderately limited)				| (limited)	
Moko-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~depth to bedrock	1.00	~depth to bedrock	1.00	~depth to bedrock	1.00	~depth to bedrock	1.00	~depth to bedrock	1.00
	| (very limited)		| (very limited)		| (very limited)		| (very limited)		| (very limited)	
	~slope	0.37	~slope	1.00	~slope	0.37	~slope	0.37	~small stones >35%	1.00
	| (moderately limited)		| (very limited)		| (moderately limited)		| (moderately limited)		| (very limited)	
					~too clayey	0.17			~slope	0.37
					| (slightly limited)				| (moderately limited)	
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
70044:										
Sonsac-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00
	| (very limited)		| (very limited)		| (very limited)		| (very limited)		| (very limited)	
	~depth to bedrock	1.00	~seepage	1.00	~depth to bedrock	1.00	~depth to bedrock	1.00	~depth to bedrock	1.00
	| (very limited)		| (very limited)		| (very limited)		| (very limited)		| (very limited)	
	~percs slowly	0.25	~depth to bedrock	1.00	~too clayey	1.00	~seepage	0.75	~too clayey	1.00
	| (slightly limited)		| (very limited)		| (very limited)		| (limited)		| (very limited)	

Table 13.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption field		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70044:										
Moko-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~depth to bedrock	1.00	~slope	1.00	~slope	1.00	~depth to bedrock	1.00	~depth to bedrock	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~slope	1.00	~depth to bedrock	1.00	~depth to bedrock	1.00	~slope	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
					~too clayey	0.30			~small stones >35%	1.00
					(moderately limited)				(very limited)	
70045:										
Keeno-----	Very limited		Very limited		Limited		Limited		Limited	
	~wetness	1.00	~wetness	1.00	~wetness	0.99	~wetness	0.80	~small stones	0.87
	(very limited)		(very limited)		(limited)		(limited)		(limited)	
	~large stones	0.00	~seepage	1.00	~too clayey	0.82	~seepage	0.75	~too clayey	0.63
	(slightly limited)		(very limited)		(limited)		(limited)		(limited)	
					~large stones	0.06			~wetness	0.50
			(limited)		(slightly limited)				(moderately limited)	
70047:										
Wanda-----	Slightly limited		Limited		Slightly limited		Not limited		Slightly limited	
	~percs slowly	0.25	~slope	0.66	~too clayey	0.24			~too clayey	0.10
	(slightly limited)		(limited)		(slightly limited)				(slightly limited)	
			~seepage	0.50						
			(moderately limited)							
70048:										
Alsup-----	Limited		Very limited		Very limited		Moderately limited		Limited	
	~wetness	0.89	~slope	1.00	~depth to bedrock	1.00	~depth to bedrock	0.45	~too clayey	0.70
	(limited)		(very limited)		(very limited)		(moderately limited)		(limited)	
	~percs slowly	0.71	~wetness	1.00	~too clayey	0.85	~wetness	0.22	~hard to pack	0.70
	(limited)		(very limited)		(limited)		(slightly limited)		(limited)	
	~depth to bedrock	0.60	~depth to bedrock	0.60	~wetness	0.52	~slope	0.16	~depth to bedrock	0.45
	(limited)		(limited)		(moderately limited)		(slightly limited)		(moderately limited)	
73000:										
Pomme-----	Slightly limited		Limited		Very limited		Not limited		Very limited	
	~percs slowly	0.25	~slope	0.91	~too clayey	1.00			~small stones >35%	1.00
	(slightly limited)		(limited)		(very limited)				(very limited)	
			~seepage	0.50	~too acid	0.18			~too clayey	1.00
			(moderately limited)		(slightly limited)				(very limited)	
									~too acid	0.18
									(slightly limited)	

Table 13.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption field		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
73008:										
Viraton-----	Very limited		Very limited		Very limited		Limited		Very limited	
	~wetness	1.00	~wetness	1.00	~wetness	1.00	~wetness	0.93	~too clayey	1.00
	(very limited)		(very limited)		(very limited)		(limited)		(very limited)	
			~seepage	0.50	~too clayey	1.00			~hard to pack	0.70
			(moderately limited)		(very limited)				(limited)	
			~slope	0.31					~wetness	0.57
			(moderately limited)						(moderately limited)	
73010:										
Wilderness-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~wetness	1.00	~wetness	1.00	~wetness	1.00	~wetness	1.00	~small stones >35%	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~percs slowly	0.25	~seepage	0.50	~too clayey	1.00			~too clayey	1.00
	(slightly limited)		(moderately limited)		(very limited)				(very limited)	
			~slope	0.08					~hard to pack	0.70
			(slightly limited)						(limited)	
73031:										
Gerald-----	Very limited		Very limited		Very limited		Limited		Very limited	
	~wetness	1.00	~wetness	1.00	~wetness	1.00	~wetness	0.99	~too clayey	1.00
	(very limited)		(very limited)		(very limited)		(limited)		(very limited)	
	~percs slowly	1.00	~seepage	0.50	~too clayey	1.00			~wetness	0.60
	(very limited)		(moderately limited)		(very limited)				(moderately limited)	
73059:										
Pomme-----	Slightly limited		Moderately limited		Very limited		Not limited		Limited	
	~percs slowly	0.25	~seepage	0.50	~too clayey	1.00			~too clayey	0.99
	(slightly limited)		(moderately limited)		(very limited)				(very limited)	
			~slope	0.08	~too acid	0.12			~too acid	0.12
			(slightly limited)		(slightly limited)				(slightly limited)	
73065:										
Wilderness-----	Very limited		Very limited		Very limited		Limited		Limited	
	~wetness	1.00	~wetness	1.00	~wetness	1.00	~wetness	0.83	~too clayey	0.90
	(very limited)		(very limited)		(very limited)		(limited)		(limited)	
	~large stones	0.00	~seepage	0.50	~too clayey	0.95			~hard to pack	0.70
	(slightly limited)		(moderately limited)		(limited)				(limited)	
			~slope	0.31	~too acid	0.36			~wetness	0.52
			(moderately limited)		(moderately limited)				(moderately limited)	

Table 13.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption field		Sewage lagoons		Sanitary landfill (trench)		Sanitary landfill (area)		Daily cover for landfill	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
73075:										
Hobson-----	Very limited		Very limited		Limited		Limited		Moderately limited	
	~wetness	1.00	~wetness	1.00	~wetness	0.89	~wetness	0.69	~wetness	0.45
	(very limited)		(very limited)		(limited)		(limited)		(moderately limited)	
					~too clayey	0.36			~too clayey	0.18
					(moderately limited)				(slightly limited)	
74625:										
Hartville-----	Very limited		Very limited		Very limited		Limited		Moderately limited	
	~wetness	1.00	~wetness	1.00	~wetness	1.00	~wetness	0.93	~wetness	0.57
	(very limited)		(very limited)		(very limited)		(limited)		(moderately limited)	
	~percs slowly	0.93	~slope	0.08	~too clayey	0.70			~too clayey	0.45
	(limited)		(slightly limited)		(limited)				(moderately limited)	
74641:										
Secesh-----	Very limited		Very limited		Very limited		Very limited		Slightly limited	
	~flooding	1.00	~flooding	1.00	~flooding	1.00	~flooding	1.00	~small stones	0.03
	(very limited)		(very limited)		(very limited)		(very limited)		(slightly limited)	
	~percs slowly	0.25	~seepage	0.50						
	(slightly limited)		(moderately limited)							
75378:										
Sturkie-----	Very limited		Very limited		Very limited		Very limited		Slightly limited	
	~flooding	1.00	~flooding	1.00	~flooding	1.00	~flooding	1.00	~too clayey	0.02
	(very limited)		(very limited)		(very limited)		(very limited)		(slightly limited)	
	~percs slowly	0.25	~seepage	0.50	~too clayey	0.13				
	(slightly limited)		(moderately limited)		(slightly limited)					
99000:										
Pits,										
quarries-----	Not rated		Not rated		Not rated		Not rated		Not rated	
99001:										
Water-----	Not rated		Not rated		Not rated		Not rated		Not rated	
99004:										
Kanima-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00	~small stones >35%	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~percs slowly	0.25	~seepage	0.50					~slope	1.00
	(slightly limited)		(moderately limited)						(very limited)	

Table 14.--Construction Materials and Excavating

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Source for roadfill		Source for sand		Source for gravel		Source for topsoil		Shallow excavations	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
15003:										
Basehor-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~depth to bedrock	1.00	~excess fines	1.00	~excess fines	1.00	~depth to bedrock	1.00	~hard bedrock <40"	1.00
	(very limited)		(thickest layer)		(bottom layer)		(very limited)		(very limited)	
			~excess fines	1.00	~excess fines	1.00	~too sandy	0.54	~cutbanks cave	0.29
			(bottom layer)		(thickest layer)		(moderately limited)		(slightly limited)	
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
15004:										
Basehor-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~depth to bedrock	1.00	~excess fines	1.00	~excess fines	1.00	~depth to bedrock	1.00	~hard bedrock <40"	1.00
	(very limited)		(thickest layer)		(bottom layer)		(very limited)		(very limited)	
	~slope	0.67	~excess fines	1.00	~excess fines	1.00	~slope	1.00	~slope	1.00
	(limited)		(bottom layer)		(thickest layer)		(very limited)		(very limited)	
							~too acid	0.54	~cutbanks cave	0.29
							(moderately limited)		(slightly limited)	
40000:										
Barden-----	Very limited		Very limited		Very limited		Limited		Very limited	
	~low strength	1.00	~excess fines	1.00	~excess fines	1.00	~too clayey	0.79	~wetness	1.00
	(very limited)		(thickest layer)		(bottom layer)		(limited)		(very limited)	
	~shrink-swell	0.71	~excess fines	1.00	~excess fines	1.00	~wetness	0.12	~too clayey	0.30
	(limited)		(bottom layer)		(thickest layer)		(slightly limited)		(moderately limited)	
	~wetness	0.12							~cutbanks cave	0.29
	(slightly limited)								(slightly limited)	
40003:										
Woodson-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~low strength	1.00	~excess fines	1.00	~excess fines	1.00	~too clayey	1.00	~wetness	1.00
	(very limited)		(thickest layer)		(bottom layer)		(very limited)		(very limited)	
	~shrink-swell	1.00	~excess fines	1.00	~excess fines	1.00	~wetness	0.96	~too clayey	0.74
	(very limited)		(bottom layer)		(thickest layer)		(limited)		(limited)	
	~wetness	0.96							~cutbanks cave	0.29
	(limited)								(slightly limited)	

Table 14.--Construction Materials and Excavating--Continued

Map symbol and soil name	Source for roadfill		Source for sand		Source for gravel		Source for topsoil		Shallow excavations	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
40004:										
Barden-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~low strength	1.00	~excess fines	1.00	~excess fines	1.00	~too clayey	1.00	~wetness	1.00
	(very limited)		(thickest layer)		(bottom layer)		(very limited)		(very limited)	
	~shrink-swell	1.00	~excess fines	1.00	~excess fines	1.00	~wetness	0.12	~too clayey	0.34
	(very limited)		(bottom layer)		(thickest layer)		(slightly limited)		(moderately limited)	
	~wetness	0.12							~cutbanks cave	0.29
	(slightly limited)								(slightly limited)	
40005:										
Sylvania-----	Very limited		Very limited		Very limited		Very limited		Limited	
	~low strength	1.00	~excess fines	1.00	~excess fines	1.00	~too clayey	1.00	~too clayey	0.90
	(very limited)		(thickest layer)		(bottom layer)		(very limited)		(limited)	
	~shrink-swell	1.00	~excess fines	1.00	~excess fines	1.00	~large surface stones	0.70	~wetness	0.90
	(very limited)		(bottom layer)		(thickest layer)		(limited)		(limited)	
	~depth to bedrock	0.60					~too acid	0.36	~cutbanks cave	0.29
	(limited)						(moderately limited)		(slightly limited)	
40006:										
Barco-----	Very limited		Very limited		Very limited		Limited		Moderately limited	
	~depth to bedrock	1.00	~excess fines	1.00	~excess fines	1.00	~depth to bedrock	0.93	~soft bedrock	0.35
	(very limited)		(thickest layer)		(bottom layer)		(limited)		(moderately limited)	
	~low strength	0.78	~excess fines	1.00	~excess fines	1.00	~too acid	0.48	~cutbanks cave	0.29
	(limited)		(bottom layer)		(thickest layer)		(moderately limited)		(slightly limited)	
	~shrink-swell	0.27							~too clayey	0.02
	(slightly limited)								(slightly limited)	
Sylvania-----	Limited		Very limited		Very limited		Limited		Very limited	
	~low strength	0.78	~excess fines	1.00	~excess fines	1.00	~too clayey	0.99	~cutbanks cave	1.00
	(limited)		(thickest layer)		(bottom layer)		(limited)		(very limited)	
	~shrink-swell	0.69	~excess fines	1.00	~excess fines	1.00	~area reclaim	0.92	~wetness	0.64
	(limited)		(bottom layer)		(thickest layer)		(limited)		(limited)	
	~depth to bedrock	0.48					~too acid	0.42	~too clayey	0.28
	(moderately limited)						(moderately limited)		(slightly limited)	
40007:										
Eldorado-----	Moderately limited		Very limited		Limited		Very limited		Very limited	
	~shrink-swell	0.39	~excess fines	1.00	~excess fines	0.99	~small stones	1.00	~too clayey	1.00
	(moderately limited)		(thickest layer)		(bottom layer)		(very limited)		(very limited)	
	~large stones	0.30	~excess fines	1.00	~excess fines	0.99	~area reclaim	1.00	~large stones	0.30
	(slightly limited)		(bottom layer)		(thickest layer)		(very limited)		(slightly limited)	
	~low strength	0.22	~small stones	0.38	~small stones	0.38	~large surface stones	0.70	~cutbanks cave	0.29
	(slightly limited)		(thickest layer)		(thickest layer)		(limited)		(slightly limited)	

Table 14.--Construction Materials and Excavating--Continued

Map symbol and soil name	Source for roadfill		Source for sand		Source for gravel		Source for topsoil		Shallow excavations	
	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>
40008:										
Parsons-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~low strength	1.00	~excess fines	1.00	~excess fines	1.00	~too clayey	1.00	~wetness	1.00
	(very limited)		(thickest layer)		(bottom layer)		(very limited)		(very limited)	
	~shrink-swell	1.00	~excess fines	1.00	~excess fines	1.00	~wetness	1.00	~too clayey	1.00
	(very limited)		(bottom layer)		(thickest layer)		(very limited)		(very limited)	
	~wetness	1.00					~too acid	0.24	~cutbanks cave	0.29
	(very limited)						(slightly limited)		(slightly limited)	
44000:										
Cherokee-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~low strength	1.00	~excess fines	1.00	~excess fines	1.00	~too clayey	1.00	~wetness	1.00
	(very limited)		(thickest layer)		(bottom layer)		(very limited)		(very limited)	
	~shrink-swell	1.00	~excess fines	1.00	~excess fines	1.00	~wetness	1.00	~too clayey	0.95
	(very limited)		(bottom layer)		(thickest layer)		(very limited)		(limited)	
	~wetness	1.00					~too acid	0.36	~cutbanks cave	0.29
	(very limited)						(moderately limited)		(slightly limited)	
46001:										
Verdigris-----	Very limited		Very limited		Very limited		Not limited		Moderately limited	
	~low strength	1.00	~excess fines	1.00	~excess fines	1.00			~flooding	0.60
	(very limited)		(thickest layer)		(bottom layer)				(moderately limited)	
	~shrink-swell	0.27	~excess fines	1.00	~excess fines	1.00			~cutbanks cave	0.29
	(slightly limited)		(bottom layer)		(thickest layer)				(slightly limited)	
46002:										
Hepler-----	Very limited		Very limited		Very limited		Limited		Very limited	
	~low strength	1.00	~excess fines	1.00	~excess fines	1.00	~wetness	0.86	~wetness	1.00
	(very limited)		(thickest layer)		(bottom layer)		(limited)		(very limited)	
	~wetness	0.86	~excess fines	1.00	~excess fines	1.00			~flooding	0.60
	(limited)		(bottom layer)		(thickest layer)				(moderately limited)	
	~shrink-swell	0.33							~cutbanks cave	0.29
	(moderately limited)								(slightly limited)	
66001:										
Dameron-----	Very limited		Very limited		Possible source		Limited		Very limited	
	~low strength	1.00	~excess fines	1.00	~excess fines	1.00	~too clayey	0.69	~cutbanks cave	1.00
	(very limited)		(thickest layer)		(thickest layer)		(limited)		(very limited)	
	~shrink-swell	0.29	~excess fines	1.00	~possible source	0.33	~small stones	0.50	~flooding	0.60
	(slightly limited)		(bottom layer)		(bottom layer)		(moderately limited)		(moderately limited)	
									~too clayey	0.10
									(slightly limited)	

Table 14.--Construction Materials and Excavating--Continued

Map symbol and soil name	Source for roadfill		Source for sand		Source for gravel		Source for topsoil		Shallow excavations	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70000:										
Bona-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~low strength	1.00	~excess fines	1.00	~excess fines	1.00	~small stones	1.00	~cutbanks cave	1.00
	| (very limited)		| (thickest layer)		| (bottom layer)		| (very limited)		| (very limited)	
	~shrink-swell	0.30	~excess fines	1.00	~excess fines	1.00			~too clayey	1.00
	| (slightly limited)		| (bottom layer)		| (thickest layer)				| (very limited)	
70006:										
Credon-----	Very limited		Very limited		Limited		Very limited		Very limited	
	~low strength	1.00	~excess fines	1.00	~excess fines	1.00	~too clayey	1.00	~cutbanks cave	1.00
	| (very limited)		| (thickest layer)		| (thickest layer)		| (very limited)		| (very limited)	
	~shrink-swell	0.45	~excess fines	1.00	~excess fines	0.99	~dense layer	0.93	~wetness	1.00
	| (moderately limited)		| (bottom layer)		| (bottom layer)		| (limited)		| (very limited)	
	~wetness	0.26					~wetness	0.26	~too clayey	1.00
	| (slightly limited)						| (slightly limited)		| (very limited)	
70007:										
Cliquot-----	Limited		Very limited		Very limited		Very limited		Very limited	
	~shrink-swell	0.74	~excess fines	1.00	~excess fines	1.00	~small stones	1.00	~cutbanks cave	1.00
	| (limited)		| (thickest layer)		| (bottom layer)		| (very limited)		| (very limited)	
	~depth to bedrock	0.30	~excess fines	1.00	~excess fines	1.00	~slope	1.00	~slope	1.00
	| (slightly limited)		| (bottom layer)		| (thickest layer)		| (very limited)		| (very limited)	
	~slope	0.08					~too acid	0.24	~wetness	0.78
	| (slightly limited)						| (slightly limited)		| (limited)	
70008:										
Goss-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~low strength	1.00	~excess fines	1.00	~excess fines	1.00	~too clayey	1.00	~cutbanks cave	1.00
	| (very limited)		| (thickest layer)		| (thickest layer)		| (very limited)		| (very limited)	
	~shrink-swell	0.45	~excess fines	1.00	~excess fines	1.00	~small stones	1.00	~too clayey	1.00
	| (moderately limited)		| (bottom layer)		| (bottom layer)		| (very limited)		| (very limited)	
							~area reclaim	1.00		
							| (very limited)			
70009:										
Goss-----	Very limited		Very limited		Limited		Very limited		Very limited	
	~low strength	1.00	~excess fines	1.00	~excess fines	0.99	~too clayey	1.00	~too clayey	1.00
	| (very limited)		| (thickest layer)		| (bottom layer)		| (very limited)		| (very limited)	
	~large stones	0.41	~excess fines	1.00	~small stones	0.66	~small stones	1.00	~large stones	0.41
	| (moderately limited)		| (bottom layer)		| (thickest layer)		| (very limited)		| (moderately limited)	
	~shrink-swell	0.33	~small stones	0.66	~small stones	0.66	~area reclaim	1.00	~cutbanks cave	0.29
	| (moderately limited)		| (thickest layer)		| (bottom layer)		| (very limited)		| (slightly limited)	

Table 14.--Construction Materials and Excavating--Continued

Map symbol and soil name	Source for roadfill		Source for sand		Source for gravel		Source for topsoil		Shallow excavations	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70010:										
Goss-----	Moderately limited		Very limited		Limited		Very limited		Very limited	
	~large stones	0.38	~excess fines	1.00	~excess fines	0.99	~slope	1.00	~slope	1.00
	| (moderately limited)		| (thickest layer)		| (bottom layer)		| (very limited)		| (very limited)	
	~slope	0.33	~excess fines	1.00	~excess fines	0.99	~too clayey	1.00	~cutbanks cave	1.00
	| (moderately limited)		| (bottom layer)		| (thickest layer)		| (very limited)		| (very limited)	
	~shrink-swell	0.25	~small stones	0.10	~small stones	0.10	~small stones	1.00	~too clayey	0.93
	| (slightly limited)		| (thickest layer)		| (thickest layer)		| (very limited)		| (limited)	
70012:										
Hoberg-----	Very limited		Very limited		Limited		Limited		Very limited	
	~low strength	1.00	~excess fines	1.00	~excess fines	1.00	~dense layer	0.95	~wetness	1.00
	| (very limited)		| (thickest layer)		| (thickest layer)		| (limited)		| (very limited)	
	~wetness	0.48	~excess fines	1.00	~small stones	0.66	~wetness	0.48	~dense layer	0.95
	| (moderately limited)		| (bottom layer)		| (bottom layer)		| (moderately limited)		| (limited)	
			~small stones	0.66	~possible source	0.42	~small stones	0.12	~too clayey	0.57
			| (bottom layer)		| (bottom layer)		| (slightly limited)		| (moderately limited)	
70014:										
Moko-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~depth to bedrock	1.00	~excess fines	1.00	~excess fines	1.00	~depth to bedrock	1.00	~hard bedrock <40"	1.00
	| (very limited)		| (thickest layer)		| (bottom layer)		| (very limited)		| (very limited)	
	~large stones	0.99	~excess fines	1.00	~excess fines	1.00	~slope	1.00	~slope	1.00
	| (very limited)		| (bottom layer)		| (thickest layer)		| (very limited)		| (very limited)	
	~slope	0.92	~small stones	1.00	~small stones	1.00	~small stones	0.97	~large stones	0.99
	| (limited)		| (thickest layer)		| (thickest layer)		| (limited)		| (very limited)	
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
70040:										
Cliquot-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~low strength	1.00	~excess fines	1.00	~excess fines	1.00	~too clayey	1.00	~too clayey	1.00
	| (very limited)		| (thickest layer)		| (bottom layer)		| (very limited)		| (very limited)	
	~shrink-swell	0.97	~excess fines	1.00	~excess fines	1.00	~small stones	1.00	~wetness	0.61
	| (limited)		| (bottom layer)		| (thickest layer)		| (very limited)		| (limited)	
	~depth to bedrock	0.90					~too acid	0.54	~cutbanks cave	0.29
	| (limited)						| (moderately limited)		| (slightly limited)	
Bolivar-----	Very limited		Very limited		Very limited		Very limited		Limited	
	~depth to bedrock	1.00	~excess fines	1.00	~excess fines	1.00	~depth to bedrock	1.00	~soft bedrock	0.79
	| (very limited)		| (thickest layer)		| (bottom layer)		| (very limited)		| (limited)	
	~low strength	0.22	~excess fines	1.00	~small stones	1.00	~too clayey	0.58	~cutbanks cave	0.29
	| (slightly limited)		| (bottom layer)		| (thickest layer)		| (moderately limited)		| (slightly limited)	
	~large stones	0.02	~small stones	1.00	~excess fines	1.00	~too sandy	0.40	~too clayey	0.05
	| (slightly limited)		| (thickest layer)		| (thickest layer)		| (moderately limited)		| (slightly limited)	

Table 14.--Construction Materials and Excavating--Continued

Map symbol and soil name	Source for roadfill		Source for sand		Source for gravel		Source for topsoil		Shallow excavations	
	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>
70041:										
Goss-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~low strength	1.00	~excess fines	1.00	~excess fines	1.00	~small stones	1.00	~too clayey	1.00
	| (very limited)		| (thickest layer)		| (bottom layer)		| (very limited)		| (very limited)	
	~shrink-swell	0.23	~excess fines	1.00	~excess fines	1.00	~slope	0.96	~slope	0.96
	| (slightly limited)		| (bottom layer)		| (thickest layer)		| (limited)		| (limited)	
	~large stones	0.19	~small stones	0.66	~small stones	0.66	~large stones	0.30	~cutbanks cave	0.29
	| (slightly limited)		| (thickest layer)		| (thickest layer)		| (slightly limited)		| (slightly limited)	
70042:										
Goss-----	Moderately limited		Very limited		Possible source		Very limited		Very limited	
	~slope	0.58	~excess fines	1.00	~possible source	0.50	~slope	1.00	~slope	1.00
	| (moderately limited)		| (thickest layer)		| (bottom layer)		| (very limited)		| (very limited)	
	~shrink-swell	0.33	~excess fines	1.00	~possible source	0.42	~small stones	1.00	~cutbanks cave	1.00
	| (moderately limited)		| (bottom layer)		| (thickest layer)		| (very limited)		| (very limited)	
							~area reclaim	1.00	~too clayey	1.00
							| (very limited)		| (very limited)	
70043:										
Sonsac-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~depth to bedrock	1.00	~excess fines	1.00	~excess fines	1.00	~too clayey	1.00	~hard bedrock <40"	1.00
	| (very limited)		| (thickest layer)		| (bottom layer)		| (very limited)		| (very limited)	
	~low strength	1.00	~excess fines	1.00	~excess fines	1.00	~small stones	1.00	~too clayey	0.99
	| (very limited)		| (bottom layer)		| (thickest layer)		| (very limited)		| (limited)	
	~large stones	0.96	~small stones	0.66	~small stones	0.66	~large stones >25%	1.00	~large stones	0.96
	| (limited)		| (thickest layer)		| (thickest layer)		| (very limited)		| (limited)	
Moko-----	Very limited		Very limited		Limited		Very limited		Very limited	
	~depth to bedrock	1.00	~excess fines	1.00	~excess fines	1.00	~depth to bedrock	1.00	~hard bedrock <40"	1.00
	| (very limited)		| (thickest layer)		| (bottom layer)		| (very limited)		| (very limited)	
			~excess fines	1.00	~excess fines	0.75	~small stones	1.00	~slope	0.37
			| (bottom layer)		| (thickest layer)		| (very limited)		| (moderately limited)	
							~too clayey	0.59	~cutbanks cave	0.29
							| (moderately limited)		| (slightly limited)	
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
70044:										
Sonsac-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~depth to bedrock	1.00	~excess fines	1.00	~excess fines	1.00	~slope	1.00	~slope	1.00
	| (very limited)		| (thickest layer)		| (bottom layer)		| (very limited)		| (very limited)	
	~low strength	1.00	~excess fines	1.00	~excess fines	1.00	~too clayey	1.00	~hard bedrock <40"	1.00
	| (very limited)		| (bottom layer)		| (thickest layer)		| (very limited)		| (very limited)	
	~shrink-swell	0.35					~small stones	1.00	~too clayey	1.00
	| (moderately limited)						| (very limited)		| (very limited)	

Table 14.--Construction Materials and Excavating--Continued

Map symbol and soil name	Source for roadfill		Source for sand		Source for gravel		Source for topsoil		Shallow excavations	
	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>
70044:										
Moko-----	Very limited		Very limited		Limited		Very limited		Very limited	
	~depth to bedrock	1.00	~excess fines	1.00	~excess fines	1.00	~depth to bedrock	1.00	~hard bedrock <40"	1.00
	| (very limited)		| (thickest layer)		| (bottom layer)		| (very limited)		| (very limited)	
	~slope	0.25	~excess fines	1.00	~excess fines	0.99	~slope	1.00	~slope	1.00
	| (slightly limited)		| (bottom layer)		| (thickest layer)		| (very limited)		| (very limited)	
							~small stones	1.00	~cutbanks cave	0.29
							| (very limited)		| (slightly limited)	
70045:										
Keeno-----	Moderately limited		Very limited		Possible source		Very limited		Very limited	
	~wetness	0.48	~excess fines	1.00	~possible source	0.42	~small stones	1.00	~cutbanks cave	1.00
	| (moderately limited)		| (thickest layer)		| (bottom layer)		| (very limited)		| (very limited)	
	~large stones	0.00	~excess fines	1.00	~possible source	0.42	~dense layer <20"	1.00	~wetness	1.00
	| (slightly limited)		| (bottom layer)		| (thickest layer)		| (very limited)		| (very limited)	
			~small stones	0.10	~small stones	0.10	~too clayey	0.67	~dense layer <20"	1.00
			| (bottom layer)		| (bottom layer)		| (limited)		| (very limited)	
70047:										
Wanda-----	Moderately limited		Very limited		Very limited		Not limited		Very limited	
	~shrink-swell	0.36	~excess fines	1.00	~excess fines	1.00			~cutbanks cave	1.00
	| (moderately limited)		| (thickest layer)		| (thickest layer)				| (very limited)	
	~low strength	0.22	~excess fines	1.00	~excess fines	1.00			~too clayey	0.10
	| (slightly limited)		| (bottom layer)		| (bottom layer)				| (slightly limited)	
70048:										
Alsup-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~low strength	1.00	~excess fines	1.00	~excess fines	1.00	~too clayey	1.00	~cutbanks cave	1.00
	| (very limited)		| (thickest layer)		| (bottom layer)		| (very limited)		| (very limited)	
	~shrink-swell	1.00	~excess fines	1.00	~excess fines	1.00	~large surface stones	0.70	~wetness	0.90
	| (very limited)		| (bottom layer)		| (thickest layer)		| (limited)		| (limited)	
	~depth to bedrock	0.45					~slope	0.16	~too clayey	0.70
	| (moderately limited)						| (slightly limited)		| (limited)	
73000:										
Pomme-----	Not limited		Very limited		Possible source		Very limited		Very limited	
			~excess fines	1.00	~possible source	0.46	~small stones	1.00	~cutbanks cave	1.00
			| (thickest layer)		| (thickest layer)		| (very limited)		| (very limited)	
			~excess fines	1.00	~possible source	0.15	~area reclaim	1.00	~too clayey	1.00
			| (bottom layer)		| (bottom layer)		| (very limited)		| (very limited)	
							~too clayey	0.77		
							| (limited)			

Table 14.--Construction Materials and Excavating--Continued

Map symbol and soil name	Source for roadfill		Source for sand		Source for gravel		Source for topsoil		Shallow excavations	
	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>
73008:										
Viraton-----	Very limited		Very limited		Very limited		Limited		Very limited	
	~low strength	1.00	~excess fines	1.00	~excess fines	1.00	~dense layer	1.00	~cutbanks cave	1.00
	(very limited)		(thickest layer)		(thickest layer)		(limited)		(very limited)	
	~wetness	0.76	~excess fines	1.00	~excess fines	1.00	~wetness	0.76	~wetness	1.00
	(limited)		(bottom layer)		(bottom layer)		(limited)		(very limited)	
									~too clayey	1.00
									(very limited)	
73010:										
Wilderness-----	Limited		Very limited		Possible source		Very limited		Very limited	
	~wetness	0.91	~excess fines	1.00	~excess fines	1.00	~small stones	1.00	~wetness	1.00
	(limited)		(thickest layer)		(bottom layer)		(very limited)		(very limited)	
			~excess fines	1.00	~possible source	0.33	~dense layer	0.96	~cutbanks cave	1.00
			(bottom layer)		(thickest layer)		(limited)		(very limited)	
							~wetness	0.91	~too clayey	1.00
							(limited)		(very limited)	
73031:										
Gerald-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~low strength	1.00	~excess fines	1.00	~excess fines	1.00	~too clayey	1.00	~wetness	1.00
	(very limited)		(thickest layer)		(thickest layer)		(very limited)		(very limited)	
	~wetness	0.86	~excess fines	1.00	~excess fines	1.00	~wetness	0.86	~cutbanks cave	1.00
	(limited)		(bottom layer)		(bottom layer)		(limited)		(very limited)	
			~small stones	0.10	~small stones	0.10			~too clayey	1.00
			(bottom layer)		(bottom layer)				(very limited)	
73059:										
Pomme-----	Not limited		Very limited		Very limited		Slightly limited		Very limited	
			~excess fines	1.00	~excess fines	1.00	~area reclaim	0.08	~cutbanks cave	1.00
			(thickest layer)		(thickest layer)		(slightly limited)		(very limited)	
			~excess fines	1.00	~excess fines	1.00			~too clayey	0.99
			(bottom layer)		(bottom layer)				(very limited)	
73065:										
Wilderness-----	Moderately limited		Very limited		Very limited		Very limited		Very limited	
	~wetness	0.58	~excess fines	1.00	~excess fines	1.00	~small stones	1.00	~wetness	1.00
	(moderately limited)		(thickest layer)		(bottom layer)		(very limited)		(very limited)	
	~large stones	0.00	~excess fines	1.00	~excess fines	1.00	~large stones >25%	1.00	~cutbanks cave	1.00
	(slightly limited)		(bottom layer)		(thickest layer)		(very limited)		(very limited)	
							~dense layer	0.99	~dense layer	0.99
							(limited)		(limited)	

Table 14.--Construction Materials and Excavating--Continued

Map symbol and soil name	Source for roadfill		Source for sand		Source for gravel		Source for topsoil		Shallow excavations	
	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>
73075:										
Hobson-----	Moderately limited		Very limited		Very limited		Very limited		Very limited	
	~shrink-swell	0.45	~excess fines	1.00	~excess fines	1.00	~dense layer <20"	1.00	~wetness	1.00
	(moderately limited)		(thickest layer)		(thickest layer)		(very limited)		(very limited)	
	~wetness	0.26	~excess fines	1.00	~excess fines	1.00	~wetness	0.26	~dense layer <20"	1.00
	(slightly limited)		(bottom layer)		(bottom layer)		(slightly limited)		(very limited)	
							~too clayey	0.06	~cutbanks cave	0.29
							(slightly limited)		(slightly limited)	
74625:										
Hartville-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~low strength	1.00	~excess fines	1.00	~excess fines	1.00	~too clayey	1.00	~wetness	1.00
	(very limited)		(thickest layer)		(bottom layer)		(very limited)		(very limited)	
	~shrink-swell	1.00	~excess fines	1.00	~excess fines	1.00	~wetness	0.76	~too clayey	0.45
	(very limited)		(bottom layer)		(thickest layer)		(limited)		(moderately limited)	
	~wetness	0.76					~too acid	0.12	~cutbanks cave	0.29
	(limited)						(slightly limited)		(slightly limited)	
74641:										
Secesh-----	Not limited		Very limited		Very limited		Very limited		Very limited	
			~excess fines	1.00	~excess fines	1.00	~small stones	1.00	~cutbanks cave	1.00
			(thickest layer)		(bottom layer)		(very limited)		(very limited)	
			~excess fines	1.00	~excess fines	1.00	~area reclaim	0.68	~flooding	0.60
			(bottom layer)		(thickest layer)		(limited)		(moderately limited)	
							~too clayey	0.25		
							(slightly limited)			
75378:										
Sturkie-----	Very limited		Very limited		Very limited		Moderately limited		Moderately limited	
	~low strength	1.00	~excess fines	1.00	~excess fines	1.00	~too clayey	0.53	~flooding	0.60
	(very limited)		(thickest layer)		(bottom layer)		(moderately limited)		(moderately limited)	
			~excess fines	1.00	~excess fines	1.00			~cutbanks cave	0.29
			(bottom layer)		(thickest layer)				(slightly limited)	
									~too clayey	0.02
									(slightly limited)	
99000:										
Pits,										
quarries-----	Not rated		Not rated		Not rated		Not rated		Not rated	
99001:										
Water-----	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 14.--Construction Materials and Excavating--Continued

Map symbol and soil name	Source for roadfill		Source for sand		Source for gravel		Source for topsoil		Shallow excavations	
	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>
99004:										
Kanima-----	Very limited		Very limited		Limited		Very limited		Very limited	
	~slope	1.00	~excess fines	1.00	~excess fines	0.75	~small stones	1.00	~slope	1.00
	(very limited)		(thickest layer)		(bottom layer)		(very limited)		(very limited)	
			~excess fines	1.00	~excess fines	0.75	~area reclaim	1.00	~cutbanks cave	0.29
			(bottom layer)		(thickest layer)		(very limited)		(slightly limited)	
							~slope	1.00		
							(very limited)			

Table 15.--Water Management

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
15003:										
Basehor-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~bedrock <20 in.	1.00	~bedrock <20 in.	1.00	~bedrock <20 in.	1.00	~depth to bedrock	1.00	~bedrock <20 in.	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~slope	0.30	~slope	0.98	~slope	0.98	~slope	0.30	~droughty	0.90
	(moderately limited)		(limited)		(limited)		(moderately limited)		(limited)	
					~droughty	0.90			~slope	0.30
					(limited)				(moderately limited)	
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
15004:										
Basehor-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~bedrock <20 in.	1.00	~slope	1.00	~slope	1.00	~depth to bedrock	1.00	~bedrock <20 in.	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~slope	1.00	~bedrock <20 in.	1.00	~bedrock <20 in.	1.00	~slope	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
			~large surface stones	0.37	~droughty	0.98	~large surface stones	0.37	~droughty	0.98
			(moderately limited)		(limited)		(moderately limited)		(limited)	
40000:										
Barden-----	Not limited		Moderately limited		Moderately limited		Moderately limited		Moderately limited	
			~percs slowly	0.39	~erodes easily	0.60	~erodes easily	0.60	~erodes easily	0.60
			(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	
					~percs slowly	0.39	~wetness	0.28	~wetness	0.28
					(moderately limited)		(slightly limited)		(slightly limited)	
40003:										
Woodson-----	Not limited		Very limited		Very limited		Limited		Limited	
			~percs slowly	1.00	~percs slowly	1.00	~wetness	0.81	~wetness	0.81
			(very limited)		(very limited)		(limited)		(limited)	
					~erodes easily	0.60	~erodes easily	0.60	~erodes easily	0.60
					(moderately limited)		(moderately limited)		(moderately limited)	
40004:										
Barden-----	Slightly limited		Moderately limited		Moderately limited		Moderately limited		Moderately limited	
	~slope	0.10	~slope	0.40	~erodes easily	0.60	~erodes easily	0.60	~erodes easily	0.60
	(slightly limited)		(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	
			~percs slowly	0.39	~slope	0.40	~wetness	0.28	~wetness	0.28
			(moderately limited)		(moderately limited)		(slightly limited)		(slightly limited)	
					~percs slowly	0.39	~slope	0.10	~slope	0.10
					(moderately limited)		(slightly limited)		(slightly limited)	

Table 15.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
40005:										
Sylvania-----	Limited		Very limited		Very limited		Limited		Limited	
	~slope	0.80	~slope	1.00	~slope	1.00	~slope	0.80	~slope	0.80
	(limited)		(very limited)		(very limited)		(limited)		(limited)	
	~depth to bedrock	0.64	~large surface stones	0.70	~large surface stones	0.70	~large surface stones	0.70	~large surface stones	0.70
	(limited)		(limited)		(limited)		(limited)		(limited)	
			~percs slowly	0.13	~percs slowly	0.13	~depth to bedrock	0.60	~depth to bedrock	0.64
			(slightly limited)		(slightly limited)		(limited)		(limited)	
40006:										
Barco-----	Limited		Moderately limited		Moderately limited		Very limited		Limited	
	~depth to bedrock	0.84	~slope	0.40	~slope	0.40	~depth to bedrock	1.00	~depth to bedrock	0.84
	(limited)		(moderately limited)		(moderately limited)		(very limited)		(limited)	
	~seepage	0.50	~depth to bedrock	0.27	~depth to bedrock	0.27	~slope	0.10	~slope	0.10
	(moderately limited)		(slightly limited)		(slightly limited)		(slightly limited)		(slightly limited)	
	~slope	0.10								
	(slightly limited)									
Sylvania-----	Moderately limited		Moderately limited		Moderately limited		Moderately limited		Moderately limited	
	~depth to bedrock	0.58	~slope	0.40	~slope	0.40	~depth to bedrock	0.48	~depth to bedrock	0.58
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	
	~slope	0.10	~percs slowly	0.17	~percs slowly	0.17	~slope	0.10	~slope	0.10
	(slightly limited)		(slightly limited)		(slightly limited)		(slightly limited)		(slightly limited)	
40007:										
Eldorado-----	Moderately limited		Very limited		Limited		Very limited		Very limited	
	~seepage	0.50	~large stones	1.00	~slope	0.98	~large stones	1.00	~large stones	1.00
	(moderately limited)		(very limited)		(limited)		(very limited)		(very limited)	
	~slope	0.30	~slope	0.98	~large surface stones	0.70	~large surface stones	0.70	~large surface stones	0.70
	(moderately limited)		(limited)		(limited)		(limited)		(limited)	
			~large surface stones	0.70	~large stones	0.30	~slope	0.30	~slope	0.30
			(limited)		(slightly limited)		(moderately limited)		(moderately limited)	
40008:										
Parsons-----	Not limited		Very limited		Very limited		Limited		Limited	
			~percs slowly	1.00	~percs slowly	1.00	~wetness	0.99	~wetness	0.99
			(very limited)		(very limited)		(limited)		(limited)	
					~erodes easily	0.60	~erodes easily	0.60	~erodes easily	0.60
					(moderately limited)		(moderately limited)		(moderately limited)	
44000:										
Cherokee-----	Not limited		Very limited		Very limited		Limited		Limited	
			~percs slowly	1.00	~percs slowly	1.00	~wetness	0.99	~wetness	0.99
			(very limited)		(very limited)		(limited)		(limited)	
					~erodes easily	0.60	~erodes easily	0.60	~erodes easily	0.60
					(moderately limited)		(moderately limited)		(moderately limited)	

Table 15.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
46001:										
Verdigris-----	Moderately limited		Limited		Limited		Moderately limited		Moderately limited	
	~seepage	0.50	~flooding	0.90	~flooding	0.90	~erodes easily	0.60	~erodes easily	0.60
	(moderately limited)		(limited)		(limited)		(moderately limited)		(moderately limited)	
					~erodes easily	0.60				
					(moderately limited)					
46002:										
Hepler-----	Not limited		Moderately limited		Moderately limited		Moderately limited		Moderately limited	
			~flooding	0.60	~flooding	0.60	~wetness	0.60	~wetness	0.60
			(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	
			~percs slowly	0.17	~percs slowly	0.17				
			(slightly limited)		(slightly limited)					
66001:										
Dameron-----	Moderately limited		Limited		Limited		Not limited		Not limited	
	~seepage	0.50	~flooding	0.90	~flooding	0.90				
	(moderately limited)		(limited)		(limited)					
70000:										
Bona-----	Moderately limited		Limited		Limited		Slightly limited		Slightly limited	
	~seepage	0.50	~slope	0.78	~slope	0.78	~slope	0.20	~slope	0.20
	(moderately limited)		(limited)		(limited)		(slightly limited)		(slightly limited)	
	~slope	0.20	~percs slowly	0.13	~percs slowly	0.13				
	(slightly limited)		(slightly limited)		(slightly limited)					
70006:										
Credon-----	Moderately limited		Slightly limited		Slightly limited		Moderately limited		Limited	
	~seepage	0.50	~percs slowly	0.13	~percs slowly	0.13	~wetness	0.36	~rooting depth	0.80
	(moderately limited)		(slightly limited)		(slightly limited)		(moderately limited)		(limited)	
			~slope	0.10	~slope	0.10			~wetness	0.36
			(slightly limited)		(slightly limited)				(moderately limited)	
70007:										
Cliquot-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~seepage	0.50	~percs slowly	0.39	~percs slowly	0.39	~large stones	0.88	~large stones	0.88
	(moderately limited)		(moderately limited)		(moderately limited)		(limited)		(limited)	
	~depth to bedrock	0.42					~depth to bedrock	0.30	~depth to bedrock	0.42
	(moderately limited)						(slightly limited)		(moderately limited)	

Table 15.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70008:										
Goss-----	Moderately limited		Limited		Limited		Moderately limited		Moderately limited	
	~seepage	0.50	~slope	0.98	~slope	0.98	~large stones	0.54	~large stones	0.54
	(moderately limited)		(limited)		(limited)		(moderately limited)		(moderately limited)	
	~slope	0.30	~large stones	0.51	~droughty	0.13	~slope	0.30	~slope	0.30
	(moderately limited)		(moderately limited)		(slightly limited)		(moderately limited)		(moderately limited)	
									~droughty	0.13
									(slightly limited)	
70009:										
Goss-----	Limited		Very limited		Very limited		Very limited		Very limited	
	~slope	0.70	~slope	1.00	~slope	1.00	~large stones	1.00	~large stones	1.00
	(limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~seepage	0.50	~large stones	1.00	~large stones	0.41	~slope	0.70	~slope	0.70
	(moderately limited)		(very limited)		(moderately limited)		(limited)		(limited)	
					~droughty	0.19			~droughty	0.19
					(slightly limited)				(slightly limited)	
70010:										
Goss-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~seepage	1.00	~large stones	0.99	~droughty	0.72	~large stones	1.00	~large stones	1.00
	(very limited)		(limited)		(limited)		(very limited)		(very limited)	
					~large stones	0.38			~droughty	0.72
					(moderately limited)				(limited)	
70012:										
Hoberg-----	Moderately limited		Not limited		Not limited		Moderately limited		Limited	
	~seepage	0.50					~wetness	0.44	~rooting depth	0.80
	(moderately limited)						(moderately limited)		(limited)	
									~wetness	0.44
									(moderately limited)	
70014:										
Moko-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~slope	1.00	~slope	1.00	~droughty	1.00	~slope	1.00	~large stones	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~bedrock <20 in.	1.00	~large stones	1.00	~slope	1.00	~depth to bedrock	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
			~bedrock <20 in.	1.00	~bedrock <20 in.	1.00	~large stones	1.00	~droughty	1.00
			(very limited)		(very limited)		(very limited)		(very limited)	
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 15.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70040:										
Cliquot-----	Limited		Moderately limited		Moderately limited		Limited		Limited	
	~depth to bedrock	0.70	~percs slowly	0.39	~percs slowly	0.39	~depth to bedrock	0.90	~depth to bedrock	0.70
	(limited)		(moderately limited)		(moderately limited)		(limited)		(limited)	
			~slope	0.10	~slope	0.10	~large stones	0.01	~large stones	0.01
			(slightly limited)		(slightly limited)		(slightly limited)		(slightly limited)	
Bolivar-----	Limited		Very limited		Moderately limited		Very limited		Very limited	
	~depth to bedrock	0.91	~large stones	1.00	~depth to bedrock	0.53	~depth to bedrock	1.00	~large stones	1.00
	(limited)		(very limited)		(moderately limited)		(very limited)		(very limited)	
	~seepage	0.50	~depth to bedrock	0.53	~droughty	0.30	~large stones	1.00	~depth to bedrock	0.91
	(moderately limited)		(moderately limited)		(moderately limited)		(very limited)		(limited)	
			~slope	0.10	~slope	0.10			~droughty	0.30
			(slightly limited)		(slightly limited)				(moderately limited)	
70041:										
Goss-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~seepage	1.00	~slope	1.00	~slope	1.00	~large stones	1.00	~large stones	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~slope	1.00	~large stones	1.00	~large stones	0.19	~slope	1.00	~slope	1.00
	(very limited)		(very limited)		(slightly limited)		(very limited)		(very limited)	
					~droughty	0.10			~droughty	0.10
					(slightly limited)				(slightly limited)	
70042:										
Goss-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~seepage	0.50			~droughty	0.17			~droughty	0.17
	(moderately limited)				(slightly limited)				(slightly limited)	
70043:										
Sonsac-----	Limited		Very limited		Very limited		Very limited		Very limited	
	~slope	0.89	~slope	1.00	~slope	1.00	~depth to bedrock	1.00	~large stones	1.00
	(limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~depth to bedrock	0.84	~large stones	1.00	~large stones	0.96	~large stones	1.00	~slope	0.89
	(limited)		(very limited)		(limited)		(very limited)		(limited)	
	~seepage	0.50	~depth to bedrock	0.27	~droughty	0.37	~slope	0.89	~depth to bedrock	0.84
	(moderately limited)		(slightly limited)		(moderately limited)		(limited)		(limited)	

Table 15.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70043:										
Moko-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~bedrock <20 in.	1.00	~bedrock <20 in.	1.00	~droughty	1.00	~depth to bedrock	1.00	~droughty	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~slope	0.89	~slope	1.00	~bedrock <20 in.	1.00	~slope	0.89	~bedrock <20 in.	1.00
	(limited)		(very limited)		(very limited)		(limited)		(very limited)	
					~slope	1.00			~slope	0.89
					(very limited)				(limited)	
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
70044:										
Sonsac-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~seepage	1.00	~large stones	0.75	~depth to bedrock	0.09	~depth to bedrock	1.00	~large stones	0.95
	(very limited)		(limited)		(slightly limited)		(very limited)		(limited)	
	~depth to bedrock	0.75	~depth to bedrock	0.09	~droughty	0.07	~large stones	0.95	~depth to bedrock	0.75
	(limited)		(slightly limited)		(slightly limited)		(limited)		(limited)	
Moko-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~bedrock <20 in.	1.00	~bedrock <20 in.	1.00	~droughty	1.00	~depth to bedrock	1.00	~droughty	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
					~bedrock <20 in.	1.00			~bedrock <20 in.	1.00
					(very limited)				(very limited)	
70045:										
Keeno-----	Very limited		Limited		Very limited		Very limited		Very limited	
	~seepage	1.00	~slope	0.98	~droughty	1.00	~large stones	1.00	~droughty	1.00
	(very limited)		(limited)		(very limited)		(very limited)		(very limited)	
	~slope	0.30	~large stones	0.65	~slope	0.98	~wetness	0.44	~large stones	1.00
	(moderately limited)		(limited)		(limited)		(moderately limited)		(very limited)	
					~large stones	0.00	~slope	0.30	~rooting depth	0.80
					(slightly limited)		(moderately limited)		(limited)	
70047:										
Wanda-----	Moderately limited		Limited		Limited		Moderately limited		Moderately limited	
	~seepage	0.50	~slope	0.78	~slope	0.78	~erodes easily	0.60	~erodes easily	0.60
	(moderately limited)		(limited)		(limited)		(moderately limited)		(moderately limited)	
	~slope	0.20			~erodes easily	0.60	~slope	0.20	~slope	0.20
	(slightly limited)				(moderately limited)		(slightly limited)		(slightly limited)	

Table 15.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70048:										
Alsup-----	Limited		Very limited		Very limited		Limited		Limited	
	~slope	0.80	~slope	1.00	~slope	1.00	~slope	0.80	~slope	0.80
	(limited)		(very limited)		(very limited)		(limited)		(limited)	
	~depth to bedrock	0.55	~large surface stones	0.70	~large surface stones	0.70	~large surface stones	0.70	~large surface stones	0.70
	(moderately limited)		(limited)		(limited)		(limited)		(limited)	
	~seepage	0.50	~percs slowly	0.13	~erodes easily	0.60	~erodes easily	0.60	~erodes easily	0.60
	(moderately limited)		(slightly limited)		(moderately limited)		(moderately limited)		(moderately limited)	
73000:										
Pomme-----	Moderately limited		Limited		Limited		Moderately limited		Moderately limited	
	~seepage	0.50	~slope	0.98	~slope	0.98	~slope	0.30	~slope	0.30
	(moderately limited)		(limited)		(limited)		(moderately limited)		(moderately limited)	
	~slope	0.30								
	(moderately limited)									
73008:										
Viraton-----	Moderately limited		Moderately limited		Moderately limited		Moderately limited		Limited	
	~seepage	0.50	~slope	0.40	~erodes easily	0.60	~erodes easily	0.60	~rooting depth	0.80
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(limited)	
	~slope	0.10			~slope	0.40	~wetness	0.55	~erodes easily	0.60
	(slightly limited)				(moderately limited)		(moderately limited)		(moderately limited)	
							~slope	0.10	~wetness	0.55
							(slightly limited)		(moderately limited)	
73010:										
Wilderness-----	Moderately limited		Slightly limited		Limited		Limited		Limited	
	~seepage	0.50	~large stones	0.12	~droughty	0.87	~wetness	0.68	~droughty	0.87
	(moderately limited)		(slightly limited)		(limited)		(limited)		(limited)	
			~slope	0.10	~slope	0.10	~large stones	0.00	~rooting depth	0.80
			(slightly limited)		(slightly limited)		(slightly limited)		(limited)	
									~wetness	0.68
									(limited)	
73031:										
Gerald-----	Moderately limited		Very limited		Very limited		Moderately limited		Moderately limited	
	~seepage	0.50	~percs slowly	1.00	~percs slowly	1.00	~erodes easily	0.60	~erodes easily	0.60
	(moderately limited)		(very limited)		(very limited)		(moderately limited)		(moderately limited)	
					~erodes easily	0.60	~wetness	0.60	~wetness	0.60
					(moderately limited)		(moderately limited)		(moderately limited)	
73059:										
Pomme-----	Moderately limited		Slightly limited		Moderately limited		Moderately limited		Moderately limited	
	~seepage	0.50	~slope	0.10	~erodes easily	0.60	~erodes easily	0.60	~erodes easily	0.60
	(moderately limited)		(slightly limited)		(moderately limited)		(moderately limited)		(moderately limited)	
					~slope	0.10				
					(slightly limited)					

Table 15.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
73065:										
Wilderness-----	Moderately limited		Limited		Limited		Very limited		Very limited	
	~seepage	0.50	~large surface stones	0.70	~droughty	0.70	~large stones	1.00	~large stones	1.00
	(moderately limited)		(limited)		(limited)		(very limited)		(very limited)	
	~slope	0.10	~slope	0.40	~large surface stones	0.70	~large surface stones	0.70	~rooting depth	0.80
	(slightly limited)		(moderately limited)		(limited)		(limited)		(limited)	
					~slope	0.40	~wetness	0.48	~droughty	0.70
					(moderately limited)		(moderately limited)		(limited)	
73075:										
Hobson-----	Not limited		Not limited		Moderately limited		Moderately limited		Limited	
					~erodes easily	0.60	~erodes easily	0.60	~rooting depth	0.80
					(moderately limited)		(moderately limited)		(limited)	
					~droughty	0.11	~wetness	0.36	~erodes easily	0.60
					(slightly limited)		(moderately limited)		(moderately limited)	
									~wetness	0.36
									(moderately limited)	
74625:										
Hartville-----	Not limited		Moderately limited		Moderately limited		Moderately limited		Moderately limited	
			~percs slowly	0.39	~erodes easily	0.60	~erodes easily	0.60	~erodes easily	0.60
			(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)	
			~slope	0.10	~percs slowly	0.39	~wetness	0.55	~wetness	0.55
			(slightly limited)		(moderately limited)		(moderately limited)		(moderately limited)	
					~slope	0.10				
					(slightly limited)					
74641:										
Secesh-----	Moderately limited		Moderately limited		Moderately limited		Not limited		Not limited	
	~seepage	0.50	~flooding	0.60	~flooding	0.60				
	(moderately limited)		(moderately limited)		(moderately limited)					
75378:										
Sturkie-----	Moderately limited		Limited		Limited		Moderately limited		Moderately limited	
	~seepage	0.50	~flooding	0.90	~flooding	0.90	~erodes easily	0.60	~erodes easily	0.60
	(moderately limited)		(limited)		(limited)		(moderately limited)		(moderately limited)	
					~erodes easily	0.60				
					(moderately limited)					
99000:										
Pits,										
quarries-----	Not rated		Not rated		Not rated		Not rated		Not rated	
99001:										
Water-----	Not rated		Not rated		Not rated		Not rated		Not rated	

Table 15.--Water Management--Continued

Map symbol and soil name	Pond reservoir areas		Drainage		Irrigation		Terraces and diversions		Grassed waterways	
	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>	<u>Limitation</u>	<u>Value</u>
99004:										
Kanima-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~seepage	0.50	~large stones	0.30	~droughty	0.28	~large stones	0.15	~droughty	0.28
	(moderately limited)		(slightly limited)		(slightly limited)		(slightly limited)		(slightly limited)	
									~large stones	0.15
									(slightly limited)	

Table 16.--Waste Management

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Land application of manure and food-processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
15003:										
Basehor-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~bedrock <20 in. (very limited)	1.00	~bedrock <20 in. (very limited)	1.00	~bedrock <20 in. (very limited)	1.00	~depth to bedrock (very limited)	1.00	~depth to bedrock (very limited)	1.00
	~droughty (limited)	0.90	~droughty (limited)	0.90	~droughty (limited)	0.90	~slope (moderately limited)	0.30	~slope (limited)	0.91
					~slope (moderately limited)	0.30			~percs slowly (moderately limited)	0.32
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
15004:										
Basehor-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~bedrock <20 in. (very limited)	1.00	~bedrock <20 in. (very limited)	1.00	~bedrock <20 in. (very limited)	1.00	~depth to bedrock (very limited)	1.00	~slope (very limited)	1.00
	~slope (very limited)	1.00	~slope (very limited)	1.00	~slope (very limited)	1.00	~slope (very limited)	1.00	~depth to bedrock (very limited)	1.00
	~droughty (limited)	0.98	~droughty (limited)	0.98	~droughty (limited)	0.98	~large surface stones (moderately limited)	0.37	~large surface stones (moderately limited)	0.37
40000:										
Barden-----	Limited		Limited		Limited		Limited		Very limited	
	~percs slowly (limited)	0.99	~percs slowly (limited)	0.99	~percs slowly (limited)	0.99	~percs slowly (limited)	0.99	~percs slowly (very limited)	1.00
	~wetness (slightly limited)	0.28	~wetness (slightly limited)	0.28	~wetness (slightly limited)	0.28	~wetness (slightly limited)	0.28	~wetness (very limited)	1.00
									~too acid (slightly limited)	0.01
40003:										
Woodson-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~percs slowly (very limited)	1.00	~percs slowly (very limited)	1.00	~percs slowly (very limited)	1.00	~percs slowly (very limited)	1.00	~percs slowly (very limited)	1.00
	~wetness (limited)	0.81	~wetness (limited)	0.81	~wetness (limited)	0.81	~wetness (limited)	0.81	~wetness (very limited)	1.00
	~too acid (slightly limited)	0.24	~too acid (slightly limited)	0.24	~too acid (slightly limited)	0.24	~too acid (slightly limited)	0.24		

Table 16.--Waste Management--Continued

Map symbol and soil name	Land application of manure and food-processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
40008:										
Parsons-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~percs slowly	1.00	~percs slowly	1.00	~percs slowly	1.00	~percs slowly	1.00	~percs slowly	1.00
	| (very limited)		| (very limited)		| (very limited)		| (very limited)		| (very limited)	
	~wetness	0.99	~wetness	0.99	~wetness	0.99	~wetness	0.99	~wetness	1.00
	| (limited)		| (limited)		| (limited)		| (limited)		| (very limited)	
44000:										
Cherokee-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~percs slowly	1.00	~percs slowly	1.00	~percs slowly	1.00	~percs slowly	1.00	~percs slowly	1.00
	| (very limited)		| (very limited)		| (very limited)		| (very limited)		| (very limited)	
	~wetness	0.99	~wetness	0.99	~wetness	0.99	~wetness	0.99	~wetness	1.00
	| (limited)		| (limited)		| (limited)		| (limited)		| (very limited)	
									~too acid	0.01
									| (slightly limited)	
46001:										
Verdigris-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~flooding	1.00	~flooding	1.00	~flooding	1.00	~flooding	1.00	~percs slowly	1.00
	| (very limited)		| (very limited)		| (very limited)		| (very limited)		| (very limited)	
									~flooding	1.00
									| (very limited)	
46002:										
Hepler-----	Limited		Limited		Limited		Limited		Very limited	
	~flooding	0.90	~flooding	0.90	~flooding	0.90	~flooding	0.90	~percs slowly	1.00
	| (limited)		| (limited)		| (limited)		| (limited)		| (very limited)	
	~wetness	0.60	~wetness	0.60	~wetness	0.60	~wetness	0.60	~wetness	1.00
	| (moderately limited)		| (moderately limited)		| (moderately limited)		| (moderately limited)		| (very limited)	
									~flooding	0.60
									| (moderately limited)	
66001:										
Dameron-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~flooding	1.00	~flooding	1.00	~flooding	1.00	~flooding	1.00	~percs slowly	1.00
	| (very limited)		| (very limited)		| (very limited)		| (very limited)		| (very limited)	
									~flooding	1.00
									| (very limited)	
70000:										
Bona-----	Limited		Limited		Limited		Limited		Very limited	
	~percs slowly	0.60	~percs slowly	0.60	~percs slowly	0.60	~percs slowly	0.60	~percs slowly	1.00
	| (limited)		| (limited)		| (limited)		| (limited)		| (very limited)	
					~slope	0.20	~slope	0.20	~slope	0.66
					| (slightly limited)		| (slightly limited)		| (limited)	
									~too acid	0.01
									| (slightly limited)	

Table 16.--Waste Management--Continued

Map symbol and soil name	Land application of manure and food-processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70006:										
Credon-----	Moderately limited		Moderately limited		Moderately limited		Moderately limited		Very limited	
	~wetness	0.36	~wetness	0.36	~wetness	0.36	~wetness	0.36	~percs slowly	1.00
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(very limited)	
									~wetness	1.00
									(very limited)	
									~slope	0.08
									(slightly limited)	
70007:										
Cliquot-----	Limited		Limited		Very limited		Very limited		Very limited	
	~slope	0.99	~slope	0.99	~slope	1.00	~slope	1.00	~percs slowly	1.00
	(limited)		(limited)		(very limited)		(very limited)		(very limited)	
	~percs slowly	0.99	~percs slowly	0.99	~percs slowly	0.99	~percs slowly	0.99	~slope	1.00
	(limited)		(limited)		(limited)		(limited)		(very limited)	
							~depth to bedrock	0.30	~depth to bedrock	1.00
							(slightly limited)		(very limited)	
70008:										
Goss-----	Slightly limited		Slightly limited		Moderately limited		Moderately limited		Very limited	
	~droughty	0.13	~droughty	0.13	~slope	0.30	~slope	0.30	~percs slowly	1.00
	(slightly limited)		(slightly limited)		(moderately limited)		(moderately limited)		(very limited)	
					~droughty	0.13			~slope	0.91
					(slightly limited)				(limited)	
70009:										
Goss-----	Moderately limited		Moderately limited		Limited		Limited		Very limited	
	~slope	0.45	~slope	0.45	~slope	0.70	~slope	0.70	~percs slowly	1.00
	(moderately limited)		(moderately limited)		(limited)		(limited)		(very limited)	
	~droughty	0.19	~droughty	0.19	~droughty	0.19			~slope	1.00
	(slightly limited)		(slightly limited)		(slightly limited)				(very limited)	
									~too cobbly	1.00
									(very limited)	
70010:										
Goss-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~large stones	0.73	~large stones	0.73	~large stones	0.73	~large stones	0.73	~too cobbly	0.80
	(limited)		(limited)		(limited)		(limited)		(limited)	
	~droughty	0.72	~droughty	0.72	~droughty	0.72			~percs slowly	0.32
	(limited)		(limited)		(limited)				(moderately limited)	

Table 16.--Waste Management--Continued

Map symbol and soil name	Land application of manure and food-processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70012:										
Hoberg-----	Moderately limited		Moderately limited		Moderately limited		Moderately limited		Very limited	
	~wetness	0.44	~wetness	0.44	~wetness	0.44	~wetness	0.44	~percs slowly	1.00
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(very limited)	
									~wetness	1.00
									(very limited)	
70014:										
Moko-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~droughty	1.00	~droughty	1.00	~droughty	1.00	~depth to bedrock	1.00	~percs slowly	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~bedrock <20 in.	1.00	~bedrock <20 in.	1.00	~slope	1.00	~slope	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~slope	1.00	~slope	1.00	~bedrock <20 in.	1.00	~large surface stones	0.37	~depth to bedrock	1.00
	(very limited)		(very limited)		(very limited)		(moderately limited)		(very limited)	
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
70040:										
Cliquot-----	Limited		Limited		Limited		Limited		Very limited	
	~percs slowly	0.99	~percs slowly	0.99	~percs slowly	0.99	~percs slowly	0.99	~percs slowly	1.00
	(limited)		(limited)		(limited)		(limited)		(very limited)	
	~too acid	0.12	~too acid	0.12	~too acid	0.12	~depth to bedrock	0.90	~depth to bedrock	1.00
	(slightly limited)		(slightly limited)		(slightly limited)		(limited)		(very limited)	
							~too acid	0.12	~wetness	0.99
							(slightly limited)		(limited)	
Bolivar-----	Moderately limited		Moderately limited		Moderately limited		Very limited		Very limited	
	~depth to bedrock	0.53	~depth to bedrock	0.53	~depth to bedrock	0.53	~depth to bedrock	1.00	~percs slowly	1.00
	(moderately limited)		(moderately limited)		(moderately limited)		(very limited)		(very limited)	
	~droughty	0.30	~droughty	0.30	~droughty	0.30	~too acid	0.18	~depth to bedrock	1.00
	(moderately limited)		(moderately limited)		(moderately limited)		(slightly limited)		(very limited)	
	~too acid	0.18	~too acid	0.18	~too acid	0.18			~slope	0.08
	(slightly limited)		(slightly limited)		(slightly limited)				(slightly limited)	
70041:										
Goss-----	Limited		Limited		Very limited		Very limited		Very limited	
	~slope	0.91	~slope	0.91	~slope	1.00	~slope	1.00	~percs slowly	1.00
	(limited)		(limited)		(very limited)		(very limited)		(very limited)	
	~droughty	0.10	~droughty	0.10	~droughty	0.10			~slope	1.00
	(slightly limited)		(slightly limited)		(slightly limited)				(very limited)	
									~too cobbly	0.91
									(limited)	

Table 16.--Waste Management--Continued

Map symbol and soil name	Land application of manure and food-processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70042:										
Goss-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00	~percs slowly	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~too acid	0.42	~too acid	0.42	~too acid	0.42	~too acid	0.42	~slope	1.00
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(very limited)	
	~droughty	0.17	~droughty	0.17	~droughty	0.17			~too acid	0.03
	(slightly limited)		(slightly limited)		(slightly limited)				(slightly limited)	
70043:										
Sonsac-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~large stones >35%	1.00	~large stones >35%	1.00	~large stones >35%	1.00	~depth to bedrock	1.00	~percs slowly	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~slope	0.68	~slope	0.68	~slope	0.89	~large stones >35%	1.00	~depth to bedrock	1.00
	(limited)		(limited)		(limited)		(very limited)		(very limited)	
	~droughty	0.37	~droughty	0.37	~droughty	0.37	~slope	0.89	~slope	1.00
	(moderately limited)		(moderately limited)		(moderately limited)		(limited)		(very limited)	
Moko-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~droughty	1.00	~droughty	1.00	~droughty	1.00	~depth to bedrock	1.00	~percs slowly	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~bedrock <20 in.	1.00	~bedrock <20 in.	1.00	~bedrock <20 in.	1.00	~slope	0.89	~depth to bedrock	1.00
	(very limited)		(very limited)		(very limited)		(limited)		(very limited)	
	~slope	0.68	~slope	0.68	~slope	0.89			~slope	1.00
	(limited)		(limited)		(limited)				(very limited)	
Rock outcrop---	Not rated		Not rated		Not rated		Not rated		Not rated	
70044:										
Sonsac-----	Limited		Limited		Very limited		Very limited		Very limited	
	~slope	0.99	~slope	0.99	~slope	1.00	~slope	1.00	~slope	1.00
	(limited)		(limited)		(very limited)		(very limited)		(very limited)	
	~depth to bedrock	0.09	~depth to bedrock	0.09	~depth to bedrock	0.09	~depth to bedrock	1.00	~depth to bedrock	1.00
	(slightly limited)		(slightly limited)		(slightly limited)		(very limited)		(very limited)	
	~droughty	0.07	~droughty	0.07	~droughty	0.07			~percs slowly	0.32
	(slightly limited)		(slightly limited)		(slightly limited)				(moderately limited)	
Moko-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~droughty	1.00	~droughty	1.00	~slope	1.00	~depth to bedrock	1.00	~percs slowly	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~bedrock <20 in.	1.00	~bedrock <20 in.	1.00	~droughty	1.00	~slope	1.00	~slope	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~slope	1.00	~slope	1.00	~bedrock <20 in.	1.00			~depth to bedrock	1.00
	(very limited)		(very limited)		(very limited)				(very limited)	

Table 16.--Waste Management--Continued

Map symbol and soil name	Land application of manure and food-processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
70045:										
Keeno-----	Very limited		Very limited		Very limited		Moderately limited		Very limited	
	~droughty	1.00	~droughty	1.00	~droughty	1.00	~wetness	0.44	~wetness	1.00
	(very limited)		(very limited)		(very limited)		(moderately limited)		(very limited)	
	~wetness	0.44	~wetness	0.44	~wetness	0.44	~slope	0.30	~slope	0.91
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(limited)	
					~slope	0.30			~percs slowly	0.32
					(moderately limited)				(moderately limited)	
70047:										
Wanda-----	Not limited		Not limited		Slightly limited		Slightly limited		Very limited	
					~slope	0.20	~slope	0.20	~percs slowly	1.00
					(slightly limited)		(slightly limited)		(very limited)	
									~slope	0.66
									(limited)	
70048:										
Alsup-----	Limited		Limited		Limited		Limited		Very limited	
	~large surface stones	0.70	~large surface stones	0.70	~slope	0.80	~slope	0.80	~percs slowly	1.00
	(limited)		(limited)		(limited)		(limited)		(very limited)	
	~slope	0.60	~slope	0.60	~large surface stones	0.70	~large surface stones	0.70	~slope	1.00
	(moderately limited)		(moderately limited)		(limited)		(limited)		(very limited)	
	~too acid	0.24	~too acid	0.24	~too acid	0.24	~depth to bedrock	0.45	~depth to bedrock	1.00
	(slightly limited)		(slightly limited)		(slightly limited)		(moderately limited)		(very limited)	
73000:										
Pomme-----	Not limited		Not limited		Moderately limited		Moderately limited		Very limited	
					~slope	0.30	~slope	0.30	~percs slowly	1.00
					(moderately limited)		(moderately limited)		(very limited)	
									~slope	0.91
									(limited)	
73008:										
Viraton-----	Moderately limited		Moderately limited		Moderately limited		Moderately limited		Very limited	
	~wetness	0.55	~wetness	0.55	~wetness	0.55	~wetness	0.55	~percs slowly	1.00
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(very limited)	
					~slope	0.10	~slope	0.10	~wetness	1.00
					(slightly limited)		(slightly limited)		(very limited)	
									~slope	0.31
									(moderately limited)	

Table 16.--Waste Management--Continued

Map symbol and soil name	Land application of manure and food-processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
73010:										
Wilderness-----	Limited		Limited		Limited		Limited		Very limited	
	~droughty	0.87	~droughty	0.87	~droughty	0.87	~wetness	0.68	~wetness	1.00
	(limited)		(limited)		(limited)		(limited)		(very limited)	
	~wetness	0.68	~wetness	0.68	~wetness	0.68			~percs slowly	0.32
	(limited)		(limited)		(limited)				(moderately limited)	
									~slope	0.08
									(slightly limited)	
73031:										
Gerald-----	Limited		Limited		Limited		Limited		Very limited	
	~percs slowly	0.99	~percs slowly	0.99	~percs slowly	0.99	~percs slowly	0.99	~percs slowly	1.00
	(limited)		(limited)		(limited)		(limited)		(very limited)	
	~wetness	0.60	~wetness	0.60	~wetness	0.60	~wetness	0.60	~wetness	1.00
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(very limited)	
73059:										
Pomme-----	Not limited		Not limited		Not limited		Not limited		Very limited	
									~percs slowly	1.00
									(very limited)	
									~slope	0.08
									(slightly limited)	
73065:										
Wilderness-----	Limited		Limited		Limited		Limited		Very limited	
	~large stones	0.73	~large stones	0.73	~large stones	0.73	~large stones	0.73	~wetness	1.00
	(limited)		(limited)		(limited)		(limited)		(very limited)	
	~droughty	0.70	~droughty	0.70	~droughty	0.70	~large surface stones	0.70	~large surface stones	0.70
	(limited)		(limited)		(limited)		(limited)		(limited)	
	~large surface stones	0.70	~large surface stones	0.70	~large surface stones	0.70	~wetness	0.48	~percs slowly	0.32
	(limited)		(limited)		(limited)		(moderately limited)		(moderately limited)	
73075:										
Hobson-----	Moderately limited		Moderately limited		Moderately limited		Moderately limited		Very limited	
	~too acid	0.54	~too acid	0.54	~too acid	0.54	~too acid	0.54	~percs slowly	1.00
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(very limited)	
	~wetness	0.36	~wetness	0.36	~wetness	0.36	~wetness	0.36	~wetness	1.00
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(very limited)	
	~droughty	0.11	~droughty	0.11	~droughty	0.11				
	(slightly limited)		(slightly limited)		(slightly limited)					

Table 16.--Waste Management--Continued

Map symbol and soil name	Land application of manure and food-processing waste		Land application of municipal sewage sludge		Disposal of wastewater by irrigation		Treatment of wastewater by slow rate process		Treatment of wastewater by rapid infiltration process	
	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value	Limitation	Value
74625:										
Hartville-----	Limited		Limited		Limited		Limited		Very limited	
	~percs slowly	0.99	~percs slowly	0.99	~percs slowly	0.99	~percs slowly	0.99	~percs slowly	1.00
	(limited)		(limited)		(limited)		(limited)		(very limited)	
	~wetness	0.55	~wetness	0.55	~wetness	0.55	~wetness	0.55	~wetness	1.00
	(moderately limited)		(moderately limited)		(moderately limited)		(moderately limited)		(very limited)	
									~slope	0.08
									(slightly limited)	
74641:										
Secesh-----	Limited		Limited		Limited		Limited		Very limited	
	~flooding	0.90	~flooding	0.90	~flooding	0.90	~flooding	0.90	~percs slowly	1.00
	(limited)		(limited)		(limited)		(limited)		(very limited)	
									~flooding	0.60
									(moderately limited)	
75378:										
Sturkie-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~flooding	1.00	~flooding	1.00	~flooding	1.00	~flooding	1.00	~percs slowly	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
									~flooding	1.00
									(very limited)	
99000:										
Pits, quarries-	Not rated		Not rated		Not rated		Not rated		Not rated	
99001:										
Water-----	Not rated		Not rated		Not rated		Not rated		Not rated	
99004:										
Kanima-----	Very limited		Very limited		Very limited		Very limited		Very limited	
	~slope	1.00	~slope	1.00	~slope	1.00	~slope	1.00	~percs slowly	1.00
	(very limited)		(very limited)		(very limited)		(very limited)		(very limited)	
	~droughty	0.28	~droughty	0.28	~droughty	0.28			~slope	1.00
	(slightly limited)		(slightly limited)		(slightly limited)				(very limited)	

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 17 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter (fig. 11). "Loam," for example,

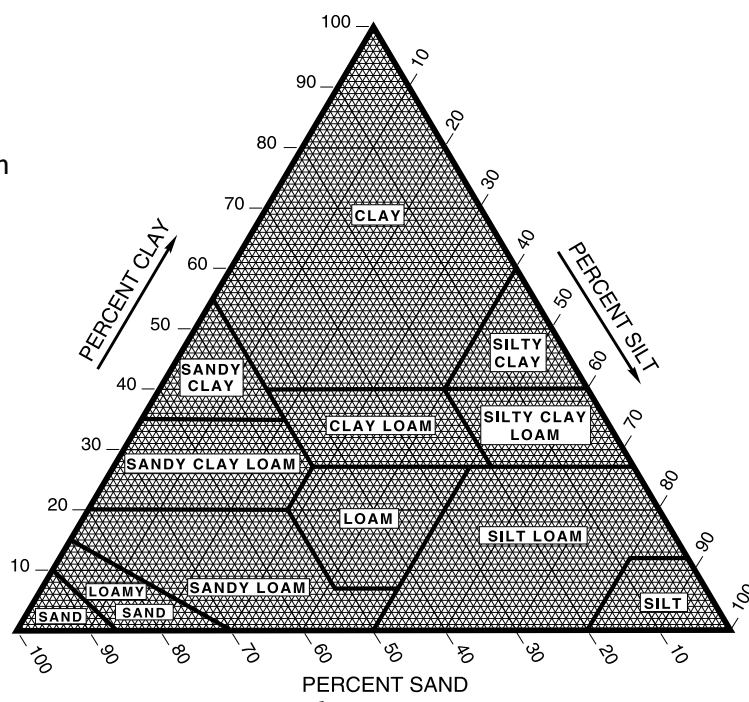


Figure 11.—Percentages of clay, silt, and sand in the basic USDA soil textural classes.

is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 1993) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 1986).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils

exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical Properties

Table 18 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field

observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $\frac{1}{3}$ -bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity refers to the ability of a soil to transmit water or air. The term "permeability," as used in soil surveys, indicates

saturated hydraulic conductivity (K_{sat}). The estimates in the table indicate the rate of water movement, in micrometers per second (um/sec), when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at $1/3$ - or $1/10$ -bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In the table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factor Kw (formerly K factor) indicates the susceptibility of a soil to sheet and rill erosion by water. Factor Kw is one of six factors used in the

Universal Soil Loss Equation (USLE), and may be used in the Revised Universal Soil Loss Equation (RUSLE), to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Factor Kw is adjusted for the effect of rock fragments. Values of Kw range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size. Factor Kf is one of the factors that may be used in the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are as follows:

1. Coarse sands, sands, fine sands, and very fine sands.
2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, ash material, and sapric soil material.
3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams.
- 4L. Calcareous loams, silt loams, clay loams, and silty clay loams.
4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay.
5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material.
6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay.
7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material.
8. Soils that are not subject to wind erosion because of coarse fragments on the surface or because of surface wetness.

Wind erodibility index is a numerical value

indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Chemical Properties

Table 19 shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable bases that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Effective cation-exchange capacity refers to the sum of extractable bases plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Water Features

Table 20 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low

runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in the table, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

The table gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of flooding is more than 50 percent in any year). *Common* is used when the occasional and frequent classes are grouped for certain purposes. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on observations of the water table at selected sites and on the evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. Indicated in the table are the depth to the seasonal high water table; the kind of water table—that is, perched, apparent, or artesian; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in the table.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone. An *artesian* water table is under hydrostatic head, generally below an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation.

Soil Features

Table 21 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness and thickness of the restrictive layer, both of which significantly affect the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

(Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Horizon	Depth	USDA texture	Classification		Fragments		Percentage passing				Liquid	Plas-
				Unified	AASHTO	>10	3-10	sieve number--				limit	ticity
						inches	inches	4	10	40	200		index
		In				Pct	Pct					Pct	
15003:													
Basehor-----	A	0-5	FSL	SM, ML	A-4	0	0-15	80-100	80-100	60-85	40-55	10-20	NP-10
	E	5-12	FSL	ML, SM	A-4	0	0-15	80-100	80-100	60-85	40-55	10-20	NP-10
	Bw	12-16	FSL, GR-FSL	SM, ML	A-4	0	0-15	60-100	60-100	45-85	15-50	10-20	NP-10
	R	16-80	UWB			---	---	---	---	---	---	---	---
Rock outcrop----	R	0-60	UWB			---	---	---	---	---	---	---	---
15004:													
Basehor-----	A	0-2	FSL	ML, SM	A-4	0	0-15	80-100	75-100	60-85	35-55	15-20	NP-6
	Bw1	2-10	FSL, GR-FSL	ML, SM	A-4	0	0-15	65-100	60-100	45-85	25-55	12-18	NP-5
	Bw2	10-16	FSL, GR-FSL	ML, SM	A-4	0	0-15	65-100	60-100	45-85	25-55	12-18	NP-5
	R	16-80	UWB			---	---	---	---	---	---	---	---
40000:													
Barden-----	Ap	0-8	SIL	CL	A-4, A-6	0	0	100	100	90-100	75-85	25-35	8-15
	Bt1	8-23	SIC, SICL, CL	CH, CL	A-7	0	0	100	100	90-100	80-95	40-60	25-40
	Bt2	23-68	SICL, CL	CL	A-6, A-7	0	0	100	90-100	85-100	60-90	30-45	15-25
	Cr	68-74	WB			---	---	---	---	---	---	---	---
40003:													
Woodson-----	Ap	0-8	SIL	CL	A-6	0	0	100	100	90-100	70-90	30-45	10-25
	Btg	8-57	SIC, C	CH	A-7-6	0	0	100	95-100	90-100	75-90	50-75	30-50
	BCg	57-80	SIC, C, CL	CH, CL	A-7-6	0	0	100	95-100	75-100	65-80	45-65	20-40
40004:													
Barden-----	A	0-7	L	CL	A-4, A-6	0	0	100	95-100	85-100	60-75	25-35	8-15
	BA	7-16	L	CL	A-4, A-6	0	0	100	95-100	85-100	60-75	25-35	8-15
	Bt	16-65	SIC, SICL, CL, C	CH, CL	A-7	0	0	100	95-100	90-100	70-90	40-60	25-40
	BC	65-80	SICL, CL	CL	A-6, A-7	0	0	100	90-100	80-100	65-90	30-45	15-25
40005:													
Sylvania-----	Ap	0-6	L	CL, CL-ML, ML	A-4, A-6	0	0-10	80-100	75-100	65-95	50-75	20-35	2-15
	A	6-11	GR-L, L	CL, CL-ML, ML	A-4, A-6	0	0-10	70-100	65-100	50-95	35-75	20-35	2-15
	BA	11-15	L, GRV-SCL, CL	CL, SC	A-6	0	0-15	50-95	30-95	20-85	15-70	25-40	10-25
	2Bt	15-45	C, SIC, GR-C	CH, CL	A-7	0	0	60-100	55-100	55-100	50-95	45-70	25-45
	2Cr	45-55	WB			---	---	---	---	---	---	---	---
40006:													
Barco-----	A	0-7	L	CL	A-4, A-6	0	0	100	100	85-95	60-75	20-35	8-15
	AB	7-14	L	CL	A-4, A-6	0	0	100	100	85-95	60-75	20-35	8-15
	Bt1	14-23	L, SCL, CL	CL, SC	A-6	0	0-5	85-100	85-100	75-100	45-80	25-40	10-29
	Bt2	23-31	L, SCL, CL, CB-	CL, SC	A-6	0	0-30	85-100	80-100	70-100	45-80	25-45	10-25
			CL										
	Cr	31-39	WB			---	---	---	---	---	---	---	---
	R	39-80	UWB			---	---	---	---	---	---	---	---
Sylvania-----	A	0-10	L	CL, CL-ML, ML	A-4, A-6	0	0	95-100	90-100	85-95	60-75	20-35	2-15
	BA	10-16	L	CL, CL-ML, ML	A-4, A-6	0	0-5	80-100	75-100	65-95	50-75	20-35	2-15
	Bt	16-32	L, CL	CL, SC	A-7, A-6	0	0-5	90-100	85-100	70-90	45-80	30-50	10-25
	BC	32-49	L, CL, GR-L	CL, SC	A-6	0	0-10	60-100	55-100	50-100	40-80	35-50	15-30
	Cr	49-60	UWB			---	---	---	---	---	---	---	---

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Horizon	Depth	USDA texture	Classification		Fragments		Percentage passing				Liquid	Plas-
				Unified	AASHTO	>10 inches	3-10 inches	sieve number--				limit	ticity
								4	10	40	200		index
		In				Pct	Pct					Pct	
40007: Eldorado-----	A1	0-8	GR-L	CL, ML, SC, SM	A-2, A-4	0-5	0-10	55-80	50-75	45-70	30-50	20-30	2-10
	A2	8-13	GRV-SIL, CB-L	GC	A-2, A-4	0-5	0-30	40-75	35-70	30-70	25-65	20-30	2-10
	Bt1	13-33	CBV-CL, GRX- SICL	GC	A-2, A-2-6	0-5	5-40	25-65	20-60	20-60	15-55	30-40	10-20
	2Bt2	33-60	CB-C, GRX-SICL, CBV-C	GC	A-2, A-6, A-7	0-15	0-35	35-65	30-60	25-60	20-55	40-60	15-30
40008: Parsons-----	A	0-8	SIL	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	25-35	7-15
	E	8-16	SIL	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	25-35	7-15
	Btg1	16-31	C, SICL, SIC	CH, CL	A-6, A-7	0	0	100	100	95-100	80-95	40-70	20-40
	Btg2	31-60	C, SICL, SIC	CH, CL	A-6, A-7	0	0	100	100	95-100	80-95	40-70	15-40
44000: Cherokee-----	Ap	0-7	SIL	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	20-35	5-15
	Eg	7-13	SIL	CL	A-6, A-4	0	0	100	100	90-100	70-100	20-35	5-15
	Btg	13-32	C, SIC	CH, CL	A-6, A-7	0	0	100	100	95-100	85-100	35-70	15-40
	2Btg2	32-52	SICL, C, SIC	CH, CL	A-6, A-7	0	0	100	100	95-100	85-95	35-70	15-40
	2BCg	52-70	SICL, C, SIC	CH, CL	A-6, A-7	0	0	100	100	95-100	85-95	35-70	15-40
46001: Verdigris-----	A	0-20	SIL	CL	A-4, A-6	0	0	100	100	90-100	70-90	25-40	9-15
	Bw	20-60	SIL, SICL	CL	A-4, A-6, A-7	0	0	100	100	90-100	70-95	30-45	9-20
46002: Hepler-----	Ap	0-9	SIL	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	20-35	5-15
	E	9-16	SIL	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	20-35	5-15
	Btg	16-60	SIL, SICL	CL	A-6, A-7	0	0	100	100	90-100	70-95	35-45	15-20
66001: Dameron-----	Ap	0-9	SIL	CL	A-6	0	0-1	95-100	90-100	85-100	70-95	25-40	10-20
	A	9-15	SIL, SICL	CL	A-6	0	0-1	95-100	90-100	85-100	70-95	30-40	15-25
	Bw1	15-24	GRV-SICL, GR- SICL, GRV-CL	CL, GC, SC	A-2-6, A-6	0	0-15	35-75	25-70	25-70	20-65	30-40	10-25
	Bw2	24-72	SICL	CL	A-6	0	0-1	85-100	75-100	70-100	45-95	25-40	10-20
	Bw3	72-80	GRX-CL	GC	A-2-6	0	0	25-30	20-25	20-25	15-20	30-40	10-20
70000: Bona-----	Ap	0-6	GR-SIL	CL, GC, GC- GM, SC	A-4	0	0-5	55-80	50-75	45-75	35-70	20-30	5-10
	A	6-18	GR-SIL, GRV-SIL	GC, GC-GM	A-1-b, A-2, A-4	0	0-10	30-65	25-60	20-55	15-50	25-30	5-10
	Bt1	18-24	GRX-SIL, GRX- SICL	GC	A-2-6, A-2-7	0	0-15	20-40	15-35	10-30	5-20	25-45	10-20
	2Bt2	24-30	GRV-C, GRV-SIC	GM	A-2-7, A-7	0	0-5	35-55	30-50	25-45	20-40	55-70	20-30
	3Bt3	30-72	C, SIC	MH	A-7	0	0-5	80-100	75-100	70-95	65-90	55-70	20-30
	3R	72-80	UWB			---	---	---	---	---	---	---	---
70006: Credon-----	Ap	0-8	SIL	CL, CL-ML, ML	A-4, A-6	0	0	90-100	90-100	85-100	70-90	20-40	2-15
	Bt	8-27	SICL, SIC, C	CL	A-7	0	0	90-100	85-100	80-100	75-85	35-50	15-25
	2Btx	27-37	GR-SICL, GRV- SIL	GC	A-2, A-6, A-7	0	0-5	35-65	30-60	30-60	20-50	30-45	10-25
	3Bt	37-60	GRV-C, CBX-C, GR-C, C	CH, GC, SC	A-2, A-7	0	0-55	45-95	40-90	35-90	30-80	55-80	30-60

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Horizon	Depth	USDA texture	Classification		Fragments		Percentage passing				Liquid	Plas-
				Unified	AASHTO	>10	3-10	sieve number--				limit	ticity
						inches	inches	4	10	40	200		index
		In				Pct	Pct					Pct	
70007: Cliquot-----	A	0-5	GR-L	GC, GC-GM, SC	A-4	0	0-15	55-80	50-75	45-70	35-50	15-25	5-15
	E	5-26	GRV-L, GR-L, GRV-SIL, GRV- FSL	GC, GC-GM	A-2-4, A-2-6, A-4	0	0-30	35-80	30-75	25-70	15-50	20-35	3-15
	2Bt1	26-49	C, CN-SIC, CN- SICL	CL, CH	A-7	0	0-15	55-100	50-100	50-95	45-85	40-65	15-35
	2Bt2	49-55	C, CN-SIC	CH, CL	A-7	0	0-15	65-100	60-100	60-95	55-85	45-65	20-35
	2Cr	55-63	WB			---	---	---	---	---	---	---	---
	2R	63-80	UWB			---	---	---	---	---	---	---	---
70008: Goss-----	Ap	0-6	GR-SIL	CL, CL-ML, ML	A-2, A-4	0-5	0-10	55-80	50-75	45-70	30-65	20-30	2-10
	BE	6-10	GRX-SIL, GRV- SIL	GC, GC-GM, GM	A-2, A-4	0-5	0-40	40-60	35-55	30-50	25-40	20-30	2-15
	Bt1	10-14	CBV-C, GRX-SIC, GRV-SIC, GRV- SICL	GC, SC	A-2-7, A-7, A-6	0-5	5-45	30-70	20-65	20-50	20-45	35-70	15-35
	2Bt2	14-80	SIC, C, GR-C, CBV-C	CH, CL	A-7	0	0-40	50-100	45-100	42-95	40-95	45-65	20-35
70009: Goss-----	A	0-4	GR-SIL	CL, CL-ML, ML	A-4, A-2	0-5	0-10	55-80	50-75	45-70	30-65	20-30	2-10
	E	4-10	GRX-SIL, GRV- SIL, GR-SICL, CBV-SIL	GC, GC-GM, GM	A-2-4, A-2	0-5	5-40	35-60	30-55	25-50	20-35	20-30	2-10
	Bt1	10-16	CBV-C, GRX-SIC, GRV-SIC, GRV- SICL, CBV-SIL	GC, SC	A-2-6, A-2-7, A-7	0-5	5-45	30-70	20-65	20-50	20-45	30-70	10-40
	2Bt2	16-60	CBV-C, C, GR-C	GC, CH, CL	A-7	0	0-40	50-100	45-100	45-95	45-95	45-65	20-35
70010: Goss-----	A	0-3	CBV-SIL	GC, GC-GM, GM	A-2-4, A-2	0-5	20-55	50-80	45-75	40-70	30-65	20-30	2-10
	E	3-15	CBX-SIL, CBV- SIL, CB-SICL	GC, GC-GM, GM	A-2-4, A-2	0-5	15-45	40-60	35-55	30-50	25-35	20-30	2-10
	Bt1	15-21	GR-SIC, GRX- SIC, GRV-SIC, GRV-SICL, GRX- SIL	GC, SC	A-2-6, A-2-7, A-7	0-5	5-30	35-70	20-65	20-50	20-45	30-70	10-40
	2Bt2	21-60	SIC, C, GRV-C, CBV-C	GC, CH, CL	A-7	0	0-25	50-100	45-100	40-95	35-95	45-65	20-35
70012: Hoberg-----	Ap	0-12	SIL	CL, CL-ML	A-4, A-6	0	0-5	85-100	75-100	70-95	60-90	25-35	7-15
	Bt	12-26	SIL, SICL, GR- SICL, GR-SIL	CL, GC, SC	A-6	0	0-10	60-95	50-90	45-85	40-80	30-40	10-20
	2Btx	26-42	GRV-SICL, GRV- SIL, GR-SIL, CBX-SICL, CBX- SIL	CL, GC, SC	A-2-6, A-6	0	0-45	35-85	30-75	20-70	20-65	30-40	10-20
	3Bt	42-62	GRV-C, GRV-SIC, CBX-C, CBX-SIC	CH, GC, MH, SC	A-2-7, A-7	0	0-45	35-65	30-60	30-60	25-55	50-75	25-40
70014: Moko-----	A1	0-5	GRV-CL	GC	A-2	0-5	5-40	50-80	45-75	40-70	30-65	25-45	8-20
	A2	5-13	CNX-SICL, CNX- CL, FLV-SIL, CNV-SIL	CL, GC, SC	A-6, A-7	0-10	40-80	65-90	60-85	55-80	40-80	25-45	8-20
	R	13-80	UWB			---	---	---	---	---	---	---	---
	Rock outcrop----	R	0-80	UWB			---	---	---	---	---	---	---

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Horizon	Depth	USDA texture	Classification		Fragments		Percentage passing				Liquid	Plas-
				Unified	AASHTO	>10 inches	3-10 inches	sieve number--				limit	ticity index
								4	10	40	200		
		In				Pct	Pct					Pct	
70040:													
Cliquot-----	A	0-3	FSL	SC, SC-SM	A-2-4, A-2-6, A-4	0	0-10	80-100	75-100	60-80	30-50	15-25	3-15
	E	3-13	GRV-L, GR-L, FSL	GC, SC	A-2-4, A-2-6	0	0-25	35-70	30-65	25-55	15-35	15-35	4-15
	2Bt1	13-20	C, CN-SIC	CH, CL	A-7	0	0-15	55-100	50-100	50-95	45-85	45-70	20-40
	2Bt2	20-31	C, CN-SIC, CN-C	CH, CL	A-7	0	0-15	55-100	50-100	50-95	45-85	45-65	15-35
	2Bt3	31-41	C, CN-SIC, CN-C	CH, CL	A-7	0	0-15	55-100	50-100	50-95	45-85	45-60	15-35
	2Cr	41-48	WB			---	---	---	---	---	---	---	---
	2R	48-80	UWB			---	---	---	---	---	---	---	---
Bolivar-----	Ap	0-7	FSL	SM, ML	A-4	0	0	90-100	85-100	65-85	40-55	10-30	NP-5
	E	7-13	L, FSL	ML, SM	A-4	0	0	90-100	85-100	65-95	40-70	10-30	NP-5
	Bt1	13-18	L, SCL, CL, GR-SCL	SC, CL	A-6	0	0-10	65-100	60-100	50-95	30-75	15-40	10-25
	Bt2	18-26	CN-SCL, GR-CL, GR-SCL, FLV-SCL	SC, SC-SM, CL	A-4, A-6	0-10	5-60	35-100	30-95	30-80	20-65	25-35	5-25
	Cr	26-38	WB			---	---	---	---	---	---	---	---
	R	38-80	UWB			---	---	---	---	---	---	---	---
70041:													
Goss-----	Ap	0-5	GRV-SIL	GC, GC-GM, GM	A-2, A-4	0	0-30	40-60	35-55	30-50	25-45	20-30	2-10
	E	5-16	CBV-SICL, CBV-SIL, GRV-SIL	GC, GC-GM, GM	A-4, A-2	0	10-40	40-65	35-60	30-55	25-50	20-30	2-10
	Bt1	16-22	CBV-SICL, GRV-SICL	GC, GC-GM, GM	A-2, A-6	0	10-45	40-60	35-55	30-55	25-55	20-40	2-20
	2Bt2	22-30	CB-SICL, CBV-SIC, CBV-C, GRV-C	GC, SC	A-2-7, A-7	0	10-45	45-70	20-65	20-60	20-55	45-50	15-40
	2Bt3	30-60	CB-SICL, CBV-SIC, CBV-C, GRV-C	GC, CH	A-2-7, A-7	0	10-55	45-90	20-85	20-80	20-70	50-70	25-40
70042:													
Goss-----	A	0-2	GRV-SIL	GC, GC-GM, GM	A-2	0-5	0-30	30-60	25-55	25-50	20-45	20-30	2-10
	E	2-10	GRV-SIL	GC, GC-GM, GM	A-2	0-5	0-30	40-60	35-55	30-50	25-45	20-30	2-10
	BE	10-16	GRV-SICL, GRV-SIL	GC, GC-GM, GM	A-2	0-5	0-30	40-60	35-55	30-50	25-45	20-30	2-10
	Bt1	16-55	GR-SIC, GRX-SIC, GRV-SICL	GC, SC	A-2-7, A-7	0-5	0-30	35-70	20-65	20-60	20-60	35-70	15-40
	2Bt2	55-68	SIC, C, GR-C, GRV-C	CH, CL, GC	A-2-7, A-7	0	0-10	40-100	35-100	30-95	25-95	45-65	20-35
70043:													
Sonsac-----	A	0-3	CBV-SIL	GC, SC	A-4, A-6	0-15	25-55	55-80	50-75	45-70	40-65	20-35	5-15
	BA	3-6	GRV-SIL, GRX-SIL, CBV-SIL	GC	A-2, A-6, A-4	0-15	10-50	35-70	30-65	25-60	20-50	15-40	5-20
	Bt	6-9	GRX-SIL, GRV-SICL, GRV-SIL, CBV-SICL	GM, GC	A-7, A-2	0-10	0-55	40-80	35-75	30-70	25-65	45-70	20-35
	2Bt	9-31	GR-C, GRV-SIC, CBV-C	GC	A-7	0-10	0-55	30-80	25-75	20-70	20-65	50-70	25-45
	2R	31-80	UWB			---	---	---	---	---	---	---	---
Moko-----	A1	0-5	GRV-SICL	GC, CL	A-6, A-7	0-5	0-20	35-60	30-55	30-55	25-50	25-45	10-20
	A2	5-12	CN-SICL, CNV-CL, FLV-SIL, CNV-SIL, GRV-SICL	CL, GC, SC	A-6, A-7	0-10	0-40	45-90	40-85	40-80	40-80	25-45	10-20
	R	12-80	UWB			---	---	---	---	---	---	---	---

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Horizon	Depth	USDA texture	Classification		Fragments		Percentage passing				Liquid	Plas-
				Unified	AASHTO	>10 inches	3-10 inches	sieve number--				limit	ticity
								4	10	40	200		index
		In				Pct	Pct					Pct	
70043:													
Rock outcrop----	R	0-60	UWB			---	---	---	---	---	---	---	---
70044:													
Sonsac-----	A	0-4	GR-SIL	CL, CL-ML	A-4, A-6	0-5	0-15	55-80	50-75	50-70	40-60	20-35	5-15
	BE	4-13	GRV-SIL, GRX-SIL, CBV-SIL	GC	A-2-4, A-2-6, A-4, A-6	0-15	0-50	30-55	25-50	20-50	15-40	15-40	5-20
	Bt	13-22	GRX-SIL, GRV-SICL, GRV-SIL, CBV-SICL, CBX-SICL	GC, GM	A-7, A-2-7, A-2-6	0-8	0-55	40-75	35-70	30-65	25-60	30-70	10-35
	2Bt	22-37	GR-C, CBV-C, GRV-SIC	GC, MH, GM	A-7, A-2-7	0-8	0-55	30-80	25-75	25-70	20-65	50-70	20-45
	2R	37-80	UWB			---	---	---	---	---	---	---	---
Moko-----	A1	0-6	GR-SIL	GC	A-6	0-5	0-15	55-80	50-75	45-70	35-65	25-45	10-20
	A2	6-14	CNX-SICL, CNV-CL, FLV-SIL, CNV-SIL, GRV-SICL	CL, GC, SC	A-6, A-7	0-10	0-70	50-90	45-85	45-80	40-80	25-45	10-25
	R	14-80	UWB			---	---	---	---	---	---	---	---
70045:													
Keeno-----	A	0-6	GR-SIL	CL, CL-ML, GC	A-2-4, A-4	0	0-15	55-90	50-85	30-80	30-65	15-30	5-10
	Bt	6-19	GRX-SICL, GRV-SICL	GC	A-2-6, A-6	0	0-35	25-55	20-50	20-45	20-45	30-40	10-20
	Btx	19-29	GRX-SICL, GRX-SIL, GR-SIL	CL, GC, SC	A-2-6, A-6	0	10-60	30-70	25-65	20-65	20-55	30-40	10-20
	2Bt	29-60	GRX-SIC, GRV-SIC, GRX-C, GRV-C	CH, CL, GC, SC	A-2-7, A-7	0	0-40	30-75	25-70	25-55	20-55	40-65	20-45
70047:													
Wanda-----	Ap	0-15	SIL	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	80-95	65-90	25-35	5-15
	Bt1	15-26	SICL, GR-SICL	CL	A-4, A-6, A-7	0	0	75-100	70-95	65-95	55-90	30-45	9-25
	Bt2	26-44	GR-SICL, SICL	CL, GC	A-6, A-7	0	0-5	55-90	50-85	50-80	45-70	35-45	10-25
	2Bt3	44-60	GR-SIC, GRV-SIC, GR-SICL	CL, CH, GC, SC	A-2-7, A-7, A-6	0-2	0-5	35-80	30-75	30-70	25-65	35-60	10-30
70048:													
Alsup-----	A	0-5	SIL	CL-ML, CL	A-4, A-6	0-5	0-5	80-100	75-100	70-100	60-90	25-40	5-20
	E	5-14	GR-SIL, L	CL	A-4, A-6	0-5	0-10	75-100	70-100	65-100	45-90	25-40	8-20
	BE	14-24	GRV-SIL, GR-SIL	CL	A-2-6, A-7	0	0-15	30-85	25-80	25-75	20-70	30-50	10-30
	2Bt	24-50	SIC, C, SICL	CH, CL	A-7	0	0-5	80-100	75-100	75-100	65-95	40-60	25-40
	2Cr	50-60	WB			---	---	---	---	---	---	---	---
73000:													
Pomme-----	Ap	0-7	SIL	CL, CL-ML	A-4, A-6	0	0-5	80-100	75-95	65-95	50-90	25-35	5-15
	Bt1	7-19	SICL, GR-SIL, GR-SICL, CL	CL	A-4, A-6, A-7-6	0	0-10	70-95	65-90	50-85	50-75	35-45	8-20
	2Bt2	19-57	GRV-SICL, CBV-SICL	GC	A-2, A-6, A-7-6	0	0-30	35-55	30-50	25-45	20-40	40-50	15-25
	3Bt3	57-86	GRX-C, CBV-C	GC	A-2-7, A-7-6	0	0-45	15-45	15-45	15-45	15-40	50-70	25-40
73008:													
Viraton-----	Ap	0-6	SIL	CL, CL-ML	A-4, A-6	0	0	80-100	75-100	70-95	65-85	20-30	5-11
	Bt	6-21	SIL, GR-SICL, SICL	CL	A-4, A-6	0	0-5	60-100	55-100	50-95	50-90	25-35	8-15
	2Btx	21-30	GRV-SIL, GRV-SICL, GR-SIL	CL, GC	A-2, A-4, A-6	0	0-15	35-65	30-60	25-60	25-50	25-35	8-15
	3Bt	30-60	GRV-C, GRX-C, GRX-SIC, GRX-	GC, CH	A-2-6, A-6, A-7	0	0-30	25-80	20-75	15-70	15-65	35-65	15-35

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Horizon	Depth	USDA texture	Classification		Fragments		Percentage passing					Liquid	Plas-
				Unified	AASHTO	>10	3-10	sieve number--					limit	ticity
						inches	inches	4	10	40	200			index
		In				Pct	Pct						Pct	
73010:														
Wilderness-----	Ap	0-6	GR-SIL	CL-ML, CL, GC	A-2-4, A-4	0	0-10	55-85	50-75	45-70	30-65	20-30	5-10	
	E	6-11	GR-SIL	CL-ML, GC, CL	A-2-4, A-4	0	0-10	55-85	50-75	45-70	30-65	20-30	5-10	
	Bt	11-25	GRV-SICL, GRX- SICL, GRV-SIL	GC	A-2-6, A-6	0-5	0-15	25-55	20-50	15-45	15-40	25-40	10-20	
	Btx	25-32	GRV-SIL, GRV- SICL, GRX-SIL	GC, GC-GM	A-1, A-2-4, A-2-6	0-5	0-20	25-50	20-45	15-40	10-35	20-40	5-15	
	2Bt	32-60	GR-C, C, GRV-C	CH, CL, GC	A-7	0	0-10	30-75	25-70	25-65	25-60	45-60	25-30	
73031:														
Gerald-----	Ap	0-11	SIL	CL, CL-ML	A-4	0	0	95-100	85-100	80-95	75-90	20-30	6-10	
	E	11-16	SIL	CL, CL-ML	A-4	0	0	95-100	85-100	80-95	75-90	20-30	6-10	
	Bt	16-33	SIC, SICL, GR- SICL	CH, CL	A-7, A-6	0	0-5	80-100	75-100	75-90	70-85	35-55	20-30	
	2Btx	33-49	SICL, GR-SICL, GRV-SICL, GRX- SICL	CL, GM, ML	A-7, A-2, A-6	0	0-40	35-90	30-85	30-80	25-75	40-60	12-30	
	3Bt	49-77	CB-C, GRV-C, GRV-SICL, GRX- SIC, CB-SICL	GC	A-2, A-7	0	15-40	35-85	30-80	30-75	25-70	40-65	15-35	
73059:														
Pomme-----	Ap	0-8	SIL	CL, CL-ML	A-4, A-6	0	0-5	80-100	75-100	65-95	50-90	20-30	5-11	
	Bt	8-26	SICL, GR-SIL, GR-SICL, CL, SIL	CL	A-4, A-6	0	0-10	70-95	65-90	50-85	50-75	25-40	9-20	
	2Bt	26-44	GRV-SICL, CBV- SICL, GR-L, GRV-L	GC	A-2, A-6, A- 7-6	0	0-30	25-65	25-60	25-50	20-40	30-45	13-25	
	3Bt	44-72	GRX-C, CBV-C, GR-C	GC, CL	A-7-6, A-2, A-6	0	0-45	20-75	20-70	20-65	15-55	30-70	15-40	
73065:														
Wilderness-----	A	0-7	CBV-SIL	CL-ML, GC, SC, SC-SM	A-4	0	20-40	60-85	55-80	50-75	45-60	15-30	5-15	
	Bt	7-23	GRV-SIL, GRX- SICL	GC, SC	A-2-6, A-6, A-2-4	0-5	0-20	25-70	20-55	15-55	15-45	20-40	5-20	
	Btx	23-33	GRV-SIL, GRV- SICL, GRX-CL	GC, GC-GM	A-1, A-2-4, A-2-6	0-10	0-30	15-60	10-45	10-45	5-35	20-40	5-20	
	2Bt	33-70	GRV-SIC, GRV-C, GRX-SIC, C	GC, CH	A-2-6, A-7	0-10	0-30	35-90	30-85	25-80	20-70	25-70	15-30	
73075:														
Hobson-----	Ap	0-4	L	CL, CL-ML	A-4, A-6	0	0	90-100	90-100	80-90	60-65	20-30	5-12	
	E	4-8	L	CL, CL-ML	A-4, A-6	0	0	90-100	90-100	80-90	60-65	20-30	5-12	
	Bt	8-19	SCL, CL, L	CL, SC	A-4, A-6	0	0	85-100	85-100	70-95	45-75	25-40	5-15	
	2Btx	19-40	GR-CL, CL, FSL, L	CL, GC, GC- GM, SC-SM	A-4, A-6	0	0-10	55-100	50-100	50-95	40-75	20-35	5-15	
	3Bt	40-72	GRV-SCL, GRV- CL, CL	GC, GC-GM, CL	A-1, A-6, A- 4, A-2	0	0-10	40-100	35-100	30-95	20-75	25-40	5-15	
74625:														
Hartville-----	Ap	0-6	SIL	CL, ML	A-4, A-6	0	0	95-100	90-100	90-100	85-100	30-40	7-20	
	BE	6-10	SICL, SIL	CL	A-6, A-7	0	0	95-100	90-100	90-100	85-95	35-50	10-25	
	Bt	10-31	SIC, SICL	CL, CH	A-7	0	0	95-100	90-100	90-100	85-95	45-60	20-40	
	2Bt	31-60	SIC, C, SICL	CH, CL	A-7	0	0-5	90-100	85-100	80-100	70-95	45-60	20-40	

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Horizon	Depth	USDA texture	Classification		Fragments		Percentage passing				Liquid	Plas-
				Unified	AASHTO	>10	3-10	sieve number--				limit	ticity
						inches	inches	4	10	40	200		index
		In				Pct	Pct					Pct	
74641:													
Secesh-----	Ap	0-8	SIL	ML	A-4	0	0	85-100	80-100	75-95	60-90	20-30	NP-10
	BA	8-14	SICL, SIL	CL, CL-ML	A-4, A-6	0	0	80-100	75-100	70-100	60-95	25-35	5-15
	Bt	14-24	GR-SICL, GR- SIL, L	CL, GC, SC	A-6	0	0-5	65-95	55-90	30-75	25-65	30-40	10-20
	2Bt	24-60	SICL, GRV-CL, GR-SICL, GR-CL	CL, GC, SC	A-6	0	0-20	55-95	50-90	50-85	40-75	30-40	10-20
75378:													
Sturkie-----	Ap	0-8	SIL	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-100	75-95	20-30	5-15
	Bw	8-53	SIL, SICL	CL	A-4, A-6	0	0	95-100	90-100	85-100	75-95	20-40	9-15
	C	53-72	SIL, SICL	CL	A-4, A-6	0	0	95-100	90-100	85-100	75-95	20-40	9-15
99000.													
Pits, quarries													
99001.													
Water													
99004:													
Kanima-----	A	0-8	CNV-SIL	GC	A-6, A-2-6	0	0-10	40-55	35-50	35-50	30-40	30-40	12-20
	C	8-60	CNV-SIL, GRV- SICL, GRV-L, CNV-SIL	GC	A-2, A-4, A-6	0	0-10	30-55	25-50	20-50	15-40	30-40	8-20

Table 18.--Physical Properties of the Soils

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer. Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind	
										Kw	Kf	T	erodi- bility group	erodi- bility index
	In	Pct	Pct	Pct	g/cc	um/sec	In/in	Pct	Pct					
15003:														
Basehor-----	0-5	45-60	20-40	5-15	1.30-1.45	14.00-42.00	0.13-0.18	0.0-2.9	1.0-5.0	.17	.17	2	3	86
	5-12	45-60	20-40	5-15	1.30-1.45	14.00-42.00	0.13-0.17	0.0-2.9	0.5-2.5	.24	.24			
	12-16	45-60	20-40	4-15	1.30-1.45	14.00-42.00	0.08-0.17	0.0-2.9	0.3-1.0	.24	.24			
	16-80	---	---	---	---	0.00-1.40	---	---	---	---	---			
Rock outcrop-----	0-60	---	---	---	---	0.00-1.40	---	---	---	---	---	---	---	---
15004:														
Basehor-----	0-2	52-80	25-35	5-10	1.30-1.45	14.00-42.00	0.13-0.18	0.0-2.9	0.5-1.4	.15	.15	1	8	0
	2-10	55-80	25-35	5-10	1.30-1.45	14.00-42.00	0.08-0.17	0.0-2.9	0.5-2.0	.20	.20			
	10-16	55-80	25-35	5-22	1.30-1.45	14.00-42.00	0.08-0.17	0.0-2.9	0.5-1.5	.10	.20			
	16-80	---	---	---	---	0.00-1.40	---	---	---	---	---			
40000:														
Barden-----	0-8	5-35	50-70	15-27	1.40-1.50	4.00-14.00	0.21-0.24	0.0-2.9	1.0-3.0	.43	.43	3	6	48
	8-23	5-30	45-60	35-50	1.25-1.40	0.42-1.40	0.11-0.19	6.0-8.9	0.5-2.0	.24	.24			
	23-68	5-40	30-60	27-40	1.30-1.45	1.40-4.00	0.10-0.14	3.0-5.9	0.1-0.5	.37	.37			
	68-74	---	---	---	---	0.00-1.40	---	---	---	---	---			
40003:														
Woodson-----	0-8	5-20	50-60	20-27	1.25-1.45	1.40-4.00	0.21-0.23	3.0-5.9	1.5-4.0	.43	.43	3	6	48
	8-57	10-25	25-45	40-60	1.30-1.45	0.01-0.42	0.12-0.15	6.0-8.9	1.0-2.0	.24	.24			
	57-80	15-30	25-45	30-50	1.35-1.45	0.42-1.40	0.10-0.15	6.0-8.9	0.1-0.5	.28	.28			
40004:														
Barden-----	0-7	20-45	40-70	15-27	1.40-1.50	4.00-14.00	0.18-0.20	0.0-2.9	1.0-3.0	.43	.43	3	6	48
	7-16	20-45	40-70	15-27	1.40-1.50	4.00-14.00	0.18-0.20	0.0-2.9	1.0-3.0	.43	.43			
	16-65	5-30	30-60	35-50	1.25-1.40	0.42-1.40	0.11-0.19	6.0-8.9	0.3-2.0	.24	.24			
	65-80	5-40	30-60	27-40	1.30-1.45	1.40-4.00	0.10-0.14	3.0-5.9	0.1-0.5	.37	.37			
40005:														
Sylvania-----	0-6	30-50	20-50	10-25	1.20-1.45	14.00-42.00	0.16-0.21	0.0-2.9	5.0-10	.24	.32	3	5	56
	6-11	30-50	20-50	10-25	1.20-1.45	14.00-42.00	0.10-0.21	0.0-2.9	3.0-5.0	.32	.43			
	11-15	35-60	10-40	18-35	1.40-1.60	4.00-14.00	0.06-0.16	3.0-5.9	2.0-3.0	.15	.28			
	15-45	5-15	20-50	40-70	1.30-1.50	1.40-4.00	0.10-0.16	6.0-8.9	1.0-2.0	.20	.24			
	45-55	---	---	---	---	0.00-1.40	---	---	---	---	---			
40006:														
Barco-----	0-7	35-55	30-50	10-25	1.20-1.45	4.00-14.00	0.16-0.20	0.0-2.9	1.0-4.0	.24	.24	3	5	56
	7-14	30-50	30-50	10-25	1.20-1.45	4.00-14.00	0.16-0.20	0.0-2.9	1.0-3.0	.32	.32			
	14-23	25-50	25-50	18-35	1.40-1.60	4.00-14.00	0.16-0.18	3.0-5.9	0.5-2.0	.24	.28			
	23-31	25-50	25-50	18-35	1.40-1.60	4.00-14.00	0.16-0.18	3.0-5.9	0.5-2.0	.15	.24			
	31-39	---	---	---	---	1.40-4.00	---	---	---	---	---			
	39-80	---	---	---	---	1.40-14.00	---	---	---	---	---			
Sylvania-----	0-10	30-50	35-60	10-25	1.20-1.45	4.00-14.00	0.16-0.20	0.0-2.9	1.0-4.0	.32	.32	3	6	48
	10-16	30-50	35-60	10-25	1.20-1.45	4.00-14.00	0.14-0.20	0.0-2.9	1.0-3.0	.37	.43			
	16-32	15-30	30-50	18-40	1.40-1.60	1.40-4.00	0.17-0.20	6.0-8.9	0.5-2.0	.24	.28			
	32-49	15-40	25-40	18-35	1.40-1.60	1.40-4.00	0.12-0.18	3.0-5.9	0.5-1.0	.15	.32			
	49-60	---	---	---	---	1.40-4.00	---	---	---	---	---			
40007:														
Eldorado-----	0-8	5-40	40-80	18-27	1.30-1.50	4.00-14.00	0.12-0.20	0.0-2.9	3.0-5.0	.15	.24	5	7	38
	8-13	5-40	40-75	18-27	1.30-1.50	4.00-14.00	0.06-0.18	0.0-2.9	2.0-3.0	.17	.28			
	13-33	5-50	35-70	27-35	1.35-1.65	4.00-14.00	0.05-0.09	3.0-5.9	1.0-2.0	.10	.28			
	33-60	5-30	10-60	35-65	1.35-1.65	4.00-14.00	0.05-0.09	3.0-5.9	0.5-2.0	.05	.17			

Table 18.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind	
										Kw	Kf	T	erodi- bility group	erodi- bility index
	In	Pct	Pct	Pct	g/cc	um/sec	In/in	Pct	Pct					
40008:														
Parsons-----	0-8	10-30	60-75	15-25	1.30-1.50	4.00-14.00	0.18-0.24	0.0-2.9	2.0-4.0	.49	.49	3	6	48
	8-16	10-30	60-70	15-25	1.30-1.50	4.00-14.00	0.16-0.22	0.0-2.9	1.0-2.0	.49	.49			
	16-31	5-30	20-70	35-65	1.40-1.70	0.01-0.42	0.10-0.18	6.0-8.9	1.0-2.0	.20	.20			
	31-60	10-40	30-65	35-60	1.40-1.70	0.01-0.42	0.10-0.18	6.0-8.9	0.3-1.0	.37	.37			
44000:														
Cherokee-----	0-7	10-20	60-75	10-20	1.25-1.35	4.00-14.00	0.17-0.20	0.0-2.9	1.0-2.0	.49	.49	3	6	48
	7-13	3-10	65-80	10-20	1.35-1.50	4.00-14.00	0.17-0.20	0.0-2.9	0.5-1.5	.49	.49			
	13-32	3-10	30-45	40-60	1.35-1.45	0.01-0.42	0.09-0.18	6.0-8.9	0.5-1.5	.28	.28			
	32-52	10-25	35-60	35-50	1.35-1.45	0.42-1.40	0.09-0.18	6.0-8.9	0.2-1.0	.37	.37			
	52-70	10-25	30-60	35-50	1.35-1.45	0.42-1.40	0.09-0.18	6.0-8.9	0.1-0.5	.37	.37			
46001:														
Verdigris-----	0-20	10-30	55-70	15-27	1.30-1.55	4.00-14.00	0.19-0.22	0.0-2.9	2.0-4.0	.32	.32	5	6	48
	20-60	5-25	50-65	18-35	1.40-1.65	4.00-14.00	0.17-0.22	3.0-5.9	0.5-3.0	.43	.43			
46002:														
Heppler-----	0-9	15-35	50-65	12-27	1.25-1.35	4.00-14.00	0.18-0.20	0.0-2.9	0.5-3.0	.37	.37	5	6	48
	9-16	10-25	60-70	12-27	1.25-1.35	4.00-14.00	0.17-0.20	0.0-2.9	0.5-1.0	.55	.55			
	16-60	10-40	45-60	20-35	1.35-1.45	1.40-4.00	0.17-0.20	3.0-5.9	0.0-0.5	.43	.43			
66001:														
Dameron-----	0-9	3-15	60-80	20-27	1.25-1.40	4.00-14.00	0.19-0.22	0.0-2.9	2.0-4.0	.32	.32	4	6	48
	9-15	3-20	50-70	20-32	1.25-1.40	4.00-14.00	0.19-0.21	3.0-5.9	2.0-4.0	.28	.28			
	15-24	20-30	40-55	27-32	1.20-1.55	4.00-14.00	0.04-0.13	0.0-2.9	0.5-2.0	.10	.28			
	24-72	10-30	40-60	27-34	1.20-1.55	4.00-14.00	0.17-0.21	3.0-5.9	0.5-2.0	.24	.32			
	72-80	25-35	30-45	27-32	1.25-1.40	4.00-14.00	0.06-0.10	0.0-2.9	0.5-1.0	.05	.24			
70000:														
Bona-----	0-6	20-35	50-70	12-27	1.30-1.50	4.00-14.00	0.12-0.22	0.0-2.9	1.0-4.0	.20	.37	3	8	0
	6-18	15-30	50-70	18-27	1.35-1.45	4.00-14.00	0.06-0.18	0.0-2.9	1.0-4.0	.10	.37			
	18-24	15-25	50-60	20-40	1.35-1.45	4.00-14.00	0.03-0.12	3.0-5.9	0.5-2.0	.10	.43			
	24-30	10-25	20-50	50-70	1.35-1.50	1.40-4.00	0.06-0.12	3.0-5.9	0.5-1.0	.05	.20			
	30-72	3-10	15-45	50-80	1.35-1.55	1.40-4.00	0.10-0.16	3.0-5.9	0.5-1.0	.05	.10			
	72-80	---	---	---	---	0.00-0.42	---	---	---	---	---			
70006:														
Credon-----	0-8	5-20	55-75	10-25	1.20-1.40	4.00-14.00	0.19-0.22	0.0-2.9	1.0-4.0	.32	.37	4	5	56
	8-27	5-20	30-60	27-50	1.30-1.50	1.40-4.00	0.15-0.17	3.0-5.9	1.0-2.0	.28	.32			
	27-37	5-20	45-65	20-35	1.60-1.90	0.01-0.42	0.04-0.07	0.0-2.9	0.1-0.5	.15	.49			
	37-60	10-25	20-35	40-70	1.30-1.55	4.00-14.00	0.04-0.08	6.0-8.9	0.1-0.5	.10	.15			
70007:														
Cliquot-----	0-5	40-50	35-50	8-18	1.30-1.50	4.00-14.00	0.11-0.15	0.0-2.9	4.0-8.0	.24	.37	4	8	0
	5-26	30-60	25-60	8-27	1.40-1.55	4.00-14.00	0.08-0.14	0.0-2.9	0.5-1.0	.20	.55			
	26-49	5-15	30-55	35-70	1.30-1.55	0.42-1.40	0.10-0.16	6.0-8.9	0.3-1.0	.24	.37			
	49-55	4-15	30-55	40-60	1.30-1.55	0.42-1.40	0.07-0.12	6.0-8.9	0.2-0.5	.20	.32			
	55-63	---	---	---	---	0.00-1.40	---	---	---	---	---			
	63-80	---	---	---	---	0.00-0.42	---	---	---	---	---			
70008:														
Goss-----	0-6	5-25	65-80	12-27	1.10-1.30	14.00-42.00	0.12-0.17	0.0-2.9	1.0-4.0	.28	.49	2	8	0
	6-10	5-20	65-80	10-30	1.10-1.30	14.00-42.00	0.06-0.10	0.0-2.9	0.0-2.0	.17	.49			
	10-14	5-20	35-70	27-50	1.30-1.50	4.00-14.00	0.04-0.09	3.0-5.9	0.0-1.0	.10	.43			
	14-80	5-20	20-50	50-85	1.40-1.60	4.00-14.00	0.06-0.10	3.0-5.9	0.0-0.5	.05	.15			
70009:														
Goss-----	0-4	5-25	65-80	8-27	1.10-1.30	14.00-42.00	0.12-0.17	0.0-2.9	1.0-12	.20	.37	2	8	0
	4-10	5-20	65-80	10-30	1.10-1.30	14.00-42.00	0.06-0.10	0.0-2.9	0.1-2.0	.10	.55			
	10-16	5-20	35-70	20-50	1.30-1.50	4.00-14.00	0.04-0.09	0.0-2.9	0.0-1.0	.10	.49			
	16-60	2-15	10-40	50-85	1.40-1.60	4.00-14.00	0.06-0.10	3.0-5.9	0.0-0.5	.02	.10			

Table 18.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind	
										Kw	Kf	T	erodi- bility group	erodi- bility index
	In	Pct	Pct	Pct	g/cc	um/sec	In/in	Pct	Pct					
70010: Goss-----	0-3	5-25	60-80	12-27	1.10-1.30	14.00-42.00	0.06-0.12	0.0-2.9	1.0-12	.10	.32	2	8	0
	3-15	5-20	60-80	10-30	1.10-1.30	14.00-42.00	0.06-0.12	0.0-2.9	0.1-2.0	.10	.43			
	15-21	5-20	50-70	20-50	1.10-1.30	14.00-42.00	0.04-0.10	0.0-2.9	0.0-1.0	.10	.43			
	21-60	5-20	20-50	50-85	1.40-1.60	4.00-14.00	0.06-0.10	3.0-5.9	0.0-0.5	.05	.15			
70012: Hoberg-----	0-12	5-15	65-75	15-25	1.30-1.60	4.00-14.00	0.17-0.20	0.0-2.9	1.0-3.0	.32	.37	4	6	48
	12-26	5-15	60-70	20-30	1.50-1.70	4.00-14.00	0.12-0.19	0.0-2.9	0.5-2.0	.32	.43			
	26-42	5-25	55-70	20-30	1.60-1.90	0.42-1.40	0.02-0.06	0.0-2.9	0.2-1.0	.10	.49			
	42-62	5-20	20-40	40-75	1.10-1.40	1.40-4.00	0.02-0.05	3.0-5.9	0.1-0.5	.05	.28			
70014: Moko-----	0-5	10-35	30-65	18-35	1.25-1.50	4.00-14.00	0.08-0.13	0.0-2.9	4.0-10	.10	.28	1	8	0
	5-13	10-30	40-65	18-35	1.25-1.60	4.00-14.00	0.03-0.14	0.0-2.9	3.0-8.0	.10	.37			
	13-80	---	---	---	---	0.00-4.20	---	---	---	---	---			
Rock outcrop-----	0-80	---	---	---	---	0.00-4.20	---	---	---	---	---	---	8	0
70040: Cliquot-----	0-3	40-65	35-60	4-18	1.30-1.50	4.00-14.00	0.14-0.19	0.0-2.9	4.0-8.0	.24	.28	3	5	56
	3-13	30-65	25-60	10-27	1.40-1.55	4.00-14.00	0.07-0.15	0.0-2.9	0.5-3.0	.10	.24			
	13-20	5-20	20-50	50-70	1.30-1.55	0.42-1.40	0.09-0.16	6.0-8.9	0.5-2.0	.15	.20			
	20-31	5-35	15-50	45-60	1.30-1.55	0.42-1.40	0.09-0.16	6.0-8.9	0.2-1.0	.10	.15			
	31-41	5-35	15-55	40-60	1.30-1.55	0.42-1.40	0.09-0.16	3.0-5.9	0.2-0.5	.17	.17			
	41-48	---	---	---	---	0.00-1.40	---	---	---	---	---			
	48-80	---	---	---	---	0.00-0.42	---	---	---	---	---			
Bolivar-----	0-7	45-65	20-45	4-15	1.20-1.40	14.00-42.00	0.10-0.15	0.0-2.9	0.5-3.0	.24	.28	3	5	56
	7-13	45-65	20-45	5-18	1.20-1.40	14.00-42.00	0.10-0.18	0.0-2.9	0.3-1.0	.32	.37			
	13-18	30-60	20-40	8-35	1.30-1.50	4.00-14.00	0.12-0.21	3.0-5.9	0.3-1.0	.32	.32			
	18-26	35-55	20-40	25-40	1.35-1.55	4.00-14.00	0.10-0.18	0.0-2.9	0.1-0.6	.10	.20			
	26-38	---	---	---	---	1.40-4.00	---	---	---	---	---			
	38-80	---	---	---	---	1.40-4.00	---	---	---	---	---			
70041: Goss-----	0-5	5-25	65-80	16-27	1.10-1.30	14.00-42.00	0.06-0.12	0.0-2.9	0.5-4.0	.10	.43	2	8	0
	5-16	5-20	65-80	17-30	1.10-1.30	14.00-42.00	0.06-0.10	0.0-2.9	0.5-2.0	.17	.55			
	16-22	5-20	50-70	27-35	1.10-1.30	14.00-42.00	0.06-0.10	0.0-2.9	0.5-1.0	.20	.55			
	22-30	5-20	20-50	35-60	1.30-1.50	4.00-14.00	0.04-0.09	3.0-5.9	0.0-1.0	.05	.32			
	30-60	1-20	15-50	35-81	1.30-1.50	4.00-14.00	0.04-0.09	3.0-5.9	0.0-1.0	.05	.10			
70042: Goss-----	0-2	15-30	60-80	8-27	1.10-1.30	14.00-42.00	0.06-0.10	0.0-2.9	0.5-7.0	.10	.37	2	8	0
	2-10	10-30	60-80	9-27	1.10-1.30	14.00-42.00	0.06-0.10	0.0-2.9	0.5-2.0	.10	.37			
	10-16	9-30	60-80	18-30	1.10-1.30	14.00-42.00	0.06-0.12	0.0-2.9	0.0-0.5	.10	.43			
	16-55	10-25	35-60	35-60	1.30-1.50	4.00-14.00	0.04-0.09	3.0-5.9	0.0-0.5	.10	.37			
	55-68	10-25	20-50	50-90	1.40-1.60	4.00-14.00	0.06-0.12	3.0-5.9	0.0-0.5	.24	.28			
70043: Sonsac-----	0-3	10-30	60-75	9-27	1.40-1.55	14.00-42.00	0.06-0.12	0.0-2.9	0.5-2.0	.28	.43	3	8	0
	3-6	10-30	60-75	9-27	1.40-1.55	14.00-42.00	0.06-0.17	0.0-2.9	0.5-1.0	.17	.43			
	6-9	10-40	50-70	18-40	1.40-1.55	4.00-14.00	0.06-0.12	3.0-5.9	0.5-1.0	.05	.32			
	9-31	5-30	25-50	50-85	1.20-1.40	4.00-14.00	0.08-0.12	3.0-5.9	0.5-1.0	.05	.37			
	31-80	---	---	---	---	0.00-4.00	---	---	---	---	---			
Moko-----	0-5	10-30	45-65	18-35	1.25-1.50	4.00-14.00	0.08-0.13	0.0-2.9	4.0-10	.10	.28	1	8	0
	5-12	10-30	45-65	18-35	1.25-1.60	4.00-14.00	0.03-0.14	0.0-2.9	3.0-8.0	.10	.37			
	12-80	---	---	---	---	0.00-4.00	---	---	---	---	---			
Rock outcrop-----	0-60	---	---	---	---	0.00-4.20	---	---	---	---	---	---	8	0

Table 18.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind |erodi- |bility| |group|	Wind |erodi- |bility| |index|
										Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	um/sec	In/in	Pct	Pct					
70044: Sonsac-----	0-4	5-30	60-75	9-27	1.10-1.40	14.00-42.00	0.12-0.17	0.0-2.9	0.5-3.0	.28	.43	3	8	0
	4-13	5-30	60-75	9-27	1.10-1.40	14.00-42.00	0.06-0.14	0.0-2.9	0.5-1.0	.17	.43			
	13-22	10-40	50-70	18-40	1.10-1.40	14.00-42.00	0.07-0.14	3.0-5.9	0.5-1.0	.05	.32			
	22-37	5-30	25-50	50-85	1.30-1.50	4.00-14.00	0.08-0.12	3.0-5.9	0.5-1.0	.05	.15			
	37-80	---	---	---	---	0.00-4.00	---	---	---	---	---			
Moko-----	0-6	5-30	45-65	18-35	1.25-1.50	4.00-14.00	0.12-0.15	0.0-2.9	4.0-10	.15	.24	1	8	0
	6-14	10-30	45-65	18-35	1.25-1.60	4.00-14.00	0.03-0.14	0.0-2.9	2.0-8.0	.05	.20			
	14-80	---	---	---	---	0.00-4.00	---	---	---	---	---			
70045: Keeno-----	0-6	10-35	40-70	15-25	1.30-1.60	14.00-42.00	0.12-0.16	0.0-2.9	1.0-4.0	.24	.37	4	8	0
	6-19	5-30	40-65	27-35	1.30-1.50	4.00-14.00	0.02-0.10	0.0-2.9	0.5-3.0	.15	.43			
	19-29	15-30	40-65	20-35	1.60-1.90	0.42-1.40	0.01-0.08	0.0-2.9	0.2-0.5	.10	.43			
	29-60	10-20	30-60	35-80	1.30-1.50	14.00-42.00	0.02-0.05	3.0-5.9	0.2-0.5	.15	.28			
70047: Wanda-----	0-15	15-35	40-70	15-27	1.30-1.45	4.00-14.00	0.18-0.20	0.0-2.9	1.0-4.0	.37	.37	4	6	48
	15-26	15-35	40-65	27-35	1.40-1.55	4.00-14.00	0.15-0.19	3.0-5.9	1.0-3.0	.32	.37			
	26-44	10-35	40-60	27-35	1.40-1.55	4.00-14.00	0.15-0.19	3.0-5.9	0.5-2.0	.24	.32			
	44-60	10-30	40-60	27-45	1.40-1.55	4.00-14.00	0.06-0.18	3.0-5.9	0.2-0.8	.20	.32			
70048: Alsup-----	0-5	5-30	50-80	12-20	1.20-1.50	4.00-14.00	0.16-0.19	0.0-2.9	0.5-6.0	.43	.49	4	6	48
	5-14	5-30	40-75	12-20	1.20-1.50	4.00-14.00	0.12-0.18	0.0-2.9	0.5-2.0	.43	.55			
	14-24	5-30	45-70	18-40	1.30-1.50	4.00-14.00	0.08-0.19	3.0-5.9	0.5-2.0	.28	.49			
	24-50	1-20	30-60	35-55	1.30-1.50	1.40-4.00	0.12-0.19	6.0-8.9	0.1-1.0	.24	.24			
	50-60	---	---	---	---	0.00-1.40	---	---	---	---	---			
73000: Pomme-----	0-7	5-30	50-75	15-25	1.35-1.45	4.00-14.00	0.16-0.21	0.0-2.9	1.0-2.0	.32	.37	5	5	56
	7-19	5-25	45-65	22-35	1.30-1.45	4.00-14.00	0.14-0.21	0.0-2.9	0.2-1.0	.32	.37			
	19-57	5-25	40-60	27-40	1.30-1.45	4.00-14.00	0.08-0.14	0.0-2.9	0.1-0.5	.28	.32			
	57-86	4-20	15-35	45-75	1.25-1.40	4.00-14.00	0.04-0.10	3.0-5.9	0.1-0.5	.05	.10			
73008: Viraton-----	0-6	5-25	60-80	8-25	1.30-1.50	4.00-14.00	0.18-0.22	0.0-2.9	0.5-5.0	.43	.43	4	6	48
	6-21	5-25	50-75	18-35	1.30-1.50	4.00-14.00	0.08-0.20	0.0-2.9	0.5-1.0	.37	.43			
	21-30	5-30	40-65	18-30	1.60-1.90	0.01-0.42	0.01-0.05	0.0-2.9	0.0-0.5	.17	.43			
	30-60	5-25	20-60	27-70	1.10-1.40	1.40-4.00	0.02-0.06	3.0-5.9	0.0-0.5	.10	.15			
73010: Wilderness-----	0-6	10-35	40-80	7-27	1.20-1.45	14.00-42.00	0.12-0.15	0.0-2.9	1.0-4.0	.32	.49	3	8	0
	6-11	10-35	40-80	7-18	1.20-1.45	14.00-42.00	0.12-0.15	0.0-2.9	0.5-2.0	.37	.55			
	11-25	10-35	40-70	22-35	1.30-1.50	4.00-14.00	0.03-0.10	0.0-2.9	0.5-1.0	.10	.43			
	25-32	10-35	40-60	20-35	1.70-2.00	0.42-1.40	0.01-0.05	0.0-2.9	0.0-0.5	.10	.43			
	32-60	10-25	15-50	45-70	1.40-1.60	4.00-14.00	0.03-0.07	3.0-5.9	0.0-0.5	.05	.10			
73031: Gerald-----	0-11	2-15	75-85	11-25	1.25-1.45	4.00-14.00	0.18-0.20	0.0-2.9	1.0-2.0	.64	.64	4	6	48
	11-16	5-15	75-85	11-27	1.20-1.40	0.42-1.40	0.11-0.13	0.0-2.9	0.5-1.0	.64	.64			
	16-33	2-10	45-55	27-60	1.60-1.80	0.01-0.42	0.15-0.17	3.0-5.9	0.5-1.5	.28	.32			
	33-49	3-15	50-65	27-35	1.60-1.80	0.01-0.42	0.02-0.11	0.0-2.9	0.2-0.5	.32	.43			
	49-77	5-15	20-60	35-65	1.30-1.45	4.00-14.00	0.02-0.07	3.0-5.9	0.2-0.5	.24	.37			
73059: Pomme-----	0-8	5-35	50-75	15-25	1.35-1.45	4.00-14.00	0.16-0.21	0.0-2.9	1.0-2.0	.37	.37	5	5	56
	8-26	5-35	45-65	20-35	1.30-1.45	4.00-14.00	0.14-0.21	0.0-2.9	0.2-1.5	.37	.37			
	26-44	5-35	40-60	21-40	1.30-1.45	4.00-14.00	0.08-0.14	0.0-2.9	0.1-1.0	.17	.32			
	44-72	5-20	15-35	45-75	1.25-1.40	4.00-14.00	0.04-0.14	3.0-5.9	0.1-1.0	.10	.15			

Table 18.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind	
										Kw	Kf	T	erodi- bility group	erodi- bility index
	In	Pct	Pct	Pct	g/cc	um/sec	In/in	Pct	Pct					
73065: Wilderness-----	0-7	10-35	40-70	10-27	1.20-1.45	14.00-42.00	0.07-0.12	0.0-2.9	0.5-8.0	.15	.43	3	8	0
	7-23	10-35	40-70	15-35	1.30-1.50	4.00-14.00	0.03-0.12	0.0-2.9	0.5-2.0	.20	.49			
	23-33	10-35	30-60	20-35	1.60-2.00	0.42-1.40	0.01-0.04	0.0-2.9	0.0-1.0	.05	.28			
	33-70	10-25	15-50	40-70	1.35-1.60	4.00-14.00	0.02-0.08	3.0-5.9	0.0-0.5	.10	.15			
73075: Hobson-----	0-4	30-60	20-60	7-27	1.20-1.40	4.00-14.00	0.20-0.24	0.0-2.9	0.5-3.0	.37	.37	4	6	48
	4-8	40-60	20-50	9-27	1.20-1.40	4.00-14.00	0.20-0.24	0.0-2.9	0.5-2.0	.37	.37			
	8-19	25-50	20-50	24-35	1.25-1.45	4.00-14.00	0.14-0.18	3.0-5.9	0.5-1.0	.37	.37			
	19-40	20-50	20-50	18-32	1.60-1.90	0.42-1.40	0.07-0.11	0.0-2.9	0.2-0.5	.37	.37			
	40-72	20-50	20-50	20-36	1.20-1.40	1.40-4.00	0.06-0.11	0.0-2.9	0.2-0.5	.28	.37			
74625: Hartville-----	0-6	5-15	60-80	20-27	1.10-1.30	4.00-14.00	0.19-0.22	0.0-2.9	1.0-3.0	.37	.37	5	6	48
	6-10	5-15	50-70	24-40	1.20-1.40	0.42-1.40	0.18-0.21	3.0-5.9	0.5-2.0	.37	.43			
	10-31	4-15	50-70	35-60	1.20-1.50	0.42-1.40	0.12-0.20	3.0-5.9	0.5-1.0	.28	.32			
	31-60	4-15	30-60	35-60	1.20-1.50	0.42-1.40	0.12-0.20	6.0-8.9	0.0-0.5	.32	.37			
74641: Secesh-----	0-8	20-40	40-70	15-25	1.10-1.30	4.00-14.00	0.18-0.21	0.0-2.9	1.0-2.0	.32	.37	4	5	56
	8-14	20-40	40-60	20-30	1.20-1.40	4.00-14.00	0.16-0.19	0.0-2.9	0.5-1.0	.32	.43			
	14-24	20-40	40-60	25-35	1.20-1.40	4.00-14.00	0.12-0.19	0.0-2.9	0.5-1.0	.32	.37			
	24-60	20-40	40-60	27-35	1.30-1.50	4.00-14.00	0.10-0.19	0.0-2.9	0.5-1.0	.20	.32			
75378: Sturkie-----	0-8	2-15	60-75	15-27	1.30-1.40	4.00-14.00	0.20-0.24	0.0-2.9	2.0-4.0	.37	.37	5	5	56
	8-53	2-15	50-70	18-35	1.30-1.40	4.00-14.00	0.20-0.22	0.0-2.9	1.0-3.0	.43	.43			
	53-72	2-30	50-70	18-35	1.35-1.45	4.00-14.00	0.18-0.20	0.0-2.9	0.5-2.0	.37	.37			
99000. Pits, quarries														
99001. Water														
99004: Kanima-----	0-8	20-40	35-70	18-27	1.30-1.60	4.00-14.00	0.08-0.17	0.0-2.9	0.5-2.0	.17	.32	2	7	38
	8-60	20-40	40-60	18-35	1.40-1.70	4.00-14.00	0.02-0.12	0.0-2.9	0.0-1.0	.15	.32			

Table 19.--Chemical Properties of the Soils

(Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction
	In	meq/100 g	meq/100 g	pH
15003:				
Basehor-----	0-5	5.0-15	---	4.5-6.5
	5-12	5.0-15	---	4.5-6.5
	12-16	3.0-10	---	4.5-6.5
	16-80	---	---	---
Rock outcrop-----	0-60	---	---	---
15004:				
Basehor-----	0-2	5.0-25	5.0-20	5.1-6.5
	2-10	5.0-15	3.0-10	4.5-6.0
	10-16	5.0-15	3.0-10	4.5-6.0
	16-80	---	---	---
40000:				
Barden-----	0-8	8.0-18	---	5.1-7.3
	8-23	19-30	---	4.5-7.3
	23-68	14-20	---	4.5-7.3
	68-74	---	---	---
40003:				
Woodson-----	0-8	15-25	10-20	5.1-6.5
	8-57	20-40	20-40	5.6-7.3
	57-80	15-30	15-30	5.6-7.8
40004:				
Barden-----	0-7	5.0-20	5.0-15	5.1-7.3
	7-16	5.0-20	5.0-15	5.1-7.3
	16-65	15-25	10-20	4.5-7.3
	65-80	10-20	10-20	4.5-7.3
40005:				
Sylvania-----	0-6	20-26	5.0-15	4.5-5.5
	6-11	12-18	5.0-15	4.5-5.5
	11-15	9.0-18	5.0-20	4.5-5.5
	15-45	20-25	15-25	4.5-5.5
	45-55	---	---	---
40006:				
Barco-----	0-7	8.0-15	5.0-18	5.1-7.3
	7-14	5.0-15	5.0-18	4.5-5.5
	14-23	10-20	2.0-18	4.5-5.5
	23-31	10-20	6.0-20	4.5-5.5
	31-39	---	---	---
	39-80	---	---	---
Sylvania-----	0-10	10-25	5.0-20	4.5-5.5
	10-16	5.0-20	5.0-20	4.5-5.5
	16-32	10-25	10-25	4.5-5.5
	32-49	5.0-15	5.0-15	4.5-5.5
	49-60	---	---	---
40007:				
Eldorado-----	0-8	11-25	---	5.6-6.5
	8-13	11-25	---	5.6-6.5
	13-33	11-25	---	5.6-6.5
	33-60	20-50	---	5.6-6.5

Table 19.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction
		In meq/100 g	meq/100 g	pH
40008:				
Parsons-----	0-8	9.0-20	9.0-15	5.1-6.5
	8-16	9.0-15	5.0-15	5.1-6.5
	16-31	20-35	20-30	5.1-6.5
	31-60	15-25	10-20	5.1-6.5
44000:				
Cherokee-----	0-7	10-15	10-20	4.5-7.3
	7-13	10-15	9.0-15	4.5-6.5
	13-32	25-40	20-30	4.5-6.0
	32-52	10-20	10-20	5.1-6.0
	52-70	10-15	9.0-15	5.1-6.0
46001:				
Verdigris-----	0-20	10-17	---	5.6-7.3
	20-60	11-21	---	5.6-7.3
46002:				
Hepler-----	0-9	5.0-15	---	5.1-7.3
	9-16	5.0-15	---	4.5-7.3
	16-60	1.0-15	---	4.5-7.3
66001:				
Dameron-----	0-9	12-25	12-20	5.1-7.3
	9-15	12-25	12-20	5.1-7.3
	15-24	15-25	12-20	5.6-7.3
	24-72	12-25	15-25	5.1-7.3
	72-80	12-25	12-25	5.1-7.3
70000:				
Bona-----	0-6	10-18	8.0-18	5.1-6.5
	6-18	10-18	8.0-18	5.1-6.5
	18-24	8.0-16	6.0-16	5.1-6.5
	24-30	10-20	8.0-18	4.5-6.5
	30-72	15-30	12-25	4.5-6.5
	72-80	---	---	---
70006:				
Crelton-----	0-8	12-18	10-18	4.5-7.3
	8-27	15-24	12-24	4.5-6.5
	27-37	9.0-15	6.0-14	3.5-5.5
	37-60	25-40	20-40	4.5-6.5
70007:				
Cliquot-----	0-5	8.0-20	5.0-15	4.5-6.0
	5-26	5.0-10	2.0-10	4.5-6.0
	26-49	15-25	10-20	4.5-5.5
	49-55	15-25	10-20	4.5-5.5
	55-63	---	---	---
	63-80	---	---	---
70008:				
Goss-----	0-6	10-31	10-31	4.5-6.5
	6-10	6.0-12	3.7-12	4.5-6.5
	10-14	9.0-25	7.0-25	4.5-7.3
	14-80	25-58	21-58	4.5-7.3
70009:				
Goss-----	0-4	10-31	10-36	4.5-6.5
	4-10	6.0-12	3.7-12	4.5-6.5
	10-16	9.0-25	7.0-25	4.5-7.3
	16-60	25-58	21-58	4.5-7.3

Table 19.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation	Effective	Soil reaction
		exchange capacity	cation exchange capacity	
	In	meq/100 g	meq/100 g	pH
70010:				
Goss-----	0-3	10-31	10-42	4.5-6.5
	3-15	6.0-12	3.7-13	4.5-6.5
	15-21	7.8-25	7.0-25	4.5-7.3
	21-60	25-58	21-58	4.5-7.3
70012:				
Hoberg-----	0-12	11-18	5.0-13	5.1-7.3
	12-26	11-18	5.0-13	5.1-6.5
	26-42	11-18	5.0-13	3.5-6.0
	42-62	15-25	14-36	3.5-6.0
70014:				
Moko-----	0-5	15-30	---	6.6-7.8
	5-13	15-30	---	6.6-7.8
	13-80	---	---	---
Rock outcrop-----	0-80	---	---	---
70040:				
Cliquot-----	0-3	8.0-30	5.0-15	4.5-6.0
	3-13	5.0-10	2.0-10	4.5-6.0
	13-20	15-32	10-26	4.5-5.5
	20-31	15-28	10-24	4.5-5.5
	31-41	15-34	5.0-30	4.5-5.5
	41-48	---	---	---
	48-80	---	---	---
Bolivar-----	0-7	4.0-16	2.0-10	5.1-6.0
	7-13	3.0-12	2.0-10	5.1-6.5
	13-18	10-20	5.0-15	4.5-6.0
	18-26	10-20	10-20	4.5-6.0
	26-38	---	---	---
	38-80	---	---	---
70041:				
Goss-----	0-5	10-15	10-15	4.5-6.5
	5-16	5.0-15	5.0-15	4.5-7.3
	16-22	9.0-15	9.0-15	4.5-7.3
	22-30	15-25	10-25	4.5-7.3
	30-60	30-40	20-30	4.5-7.3
70042:				
Goss-----	0-2	5.0-15	5.0-10	4.5-6.5
	2-10	3.0-10	2.0-10	4.5-6.5
	10-16	5.0-10	3.0-10	4.5-6.0
	16-55	10-20	10-15	4.5-6.0
	55-68	15-30	15-25	4.5-7.3
70043:				
Sonsac-----	0-3	8.0-20	---	5.1-6.5
	3-6	3.0-10	---	5.1-6.5
	6-9	20-30	---	5.1-6.5
	9-31	25-45	---	5.1-7.3
	31-80	---	---	---
Moko-----	0-5	15-30	---	6.6-7.8
	5-12	15-30	---	6.6-7.8
	12-80	---	---	---
Rock outcrop-----	0-60	---	---	---

Table 19.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction
		In meq/100 g	meq/100 g	pH
70044:				
Sonsac-----	0-4	5.0-20	---	5.1-6.5
	4-13	3.0-10	---	5.1-6.5
	13-22	10-30	---	5.1-6.5
	22-37	25-45	---	5.1-6.5
	37-80	---	---	---
Moko-----	0-6	15-30	---	6.6-7.8
	6-14	15-30	---	6.6-7.8
	14-80	---	---	---
70045:				
Keeno-----	0-6	8.0-17	14-19	4.5-7.3
	6-19	15-20	14-16	3.5-6.5
	19-29	8.0-15	4.0-15	3.5-5.5
	29-60	14-40	11-40	4.5-5.5
70047:				
Wanda-----	0-15	10-16	---	5.6-7.3
	15-26	12-16	---	5.6-7.3
	26-44	12-16	---	5.1-6.5
	44-60	12-16	---	5.1-6.5
70048:				
Alsup-----	0-5	10-20	10-20	5.1-7.3
	5-14	5.0-20	5.0-15	5.1-7.3
	14-24	5.0-20	5.0-15	5.1-6.0
	24-50	10-25	10-25	4.5-6.0
	50-60	---	---	---
73000:				
Pomme-----	0-7	5.0-12	5.0-10	5.6-7.3
	7-19	8.0-16	5.0-15	5.6-7.3
	19-57	8.0-16	5.0-15	5.1-7.3
	57-86	10-30	10-25	4.5-7.3
73008:				
Viraton-----	0-6	6.0-20	3.0-20	4.5-7.3
	6-21	8.0-15	6.0-18	4.5-6.0
	21-30	8.0-15	6.0-16	3.5-5.5
	30-60	15-30	10-20	4.5-7.3
73010:				
Wilderness-----	0-6	10-15	6.0-10	4.5-6.5
	6-11	6.0-12	5.0-10	4.5-6.5
	11-25	10-15	8.0-15	4.5-6.0
	25-32	10-15	8.0-15	3.5-5.5
	32-60	25-35	25-35	4.5-6.0
73031:				
Gerald-----	0-11	8.0-16	---	4.5-7.3
	11-16	5.0-20	---	4.5-6.5
	16-33	15-30	---	4.5-6.5
	33-49	15-30	---	4.5-7.8
	49-77	20-30	---	4.5-7.3
73059:				
Pomme-----	0-8	5.0-15	5.0-15	5.6-7.3
	8-26	5.0-15	5.0-15	5.6-7.3
	26-44	5.0-15	5.0-15	5.1-7.3
	44-72	20-30	20-30	4.5-7.3

Table 19.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation	Effective	Soil reaction
		exchange capacity	cation exchange capacity	
	In	meq/100 g	meq/100 g	pH
73065:				
Wilderness-----	0-7	10-20	10-15	4.5-6.5
	7-23	5.0-15	6.0-15	4.5-6.0
	23-33	10-15	10-15	3.5-5.5
	33-70	25-35	20-35	4.5-6.0
73075:				
Hobson-----	0-4	6.0-15	4.0-12	4.5-6.0
	4-8	6.0-15	4.0-12	4.5-6.0
	8-19	8.0-15	8.0-12	4.5-6.0
	19-40	8.0-15	8.0-12	4.5-5.5
	40-72	8.0-15	8.0-12	4.5-5.5
74625:				
Hartville-----	0-6	10-18	10-16	4.5-7.3
	6-10	12-20	12-20	4.5-7.3
	10-31	15-30	15-30	4.5-7.3
	31-60	18-30	18-30	6.1-7.3
74641:				
Secesh-----	0-8	8.0-14	---	5.6-6.5
	8-14	8.0-14	---	5.1-6.5
	14-24	8.0-14	---	5.1-6.0
	24-60	8.0-14	---	5.1-6.0
75378:				
Sturkie-----	0-8	12-25	---	5.6-7.3
	8-53	12-25	---	5.6-7.3
	53-72	12-25	---	6.1-7.3
99000.				
Pits, quarries				
99001.				
Water				
99004:				
Kanima-----	0-8	16-21	---	5.6-8.4
	8-60	11-21	---	5.6-8.4

Table 20.--Water Features

(The symbol > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Hydro- logic group	Flooding			High water table		
		Frequency	Duration	Months	Depth Ft	Kind	Months
15003: Basehor-----	D	None-----	---	---	>6.0	---	---
Rock outcrop.							
15004: Basehor-----	D	None-----	---	---	>6.0	---	---
40000: Barden-----	C	None-----	---	---	2.0-3.0	Perched	Nov-Mar
40003: Woodson-----	D	None-----	---	---	0.5-2.0	Perched	Dec-Apr
40004: Barden-----	C	None-----	---	---	2.0-3.0	Perched	Nov-Mar
40005: Sylvania-----	B	None-----	---	---	2.5-4.0	Perched	Dec-Mar
40006: Barco-----	B	None-----	---	---	>6	---	---
Sylvania-----	C	None-----	---	---	2.5-4.0	Perched	Dec-Mar
40007: Eldorado-----	B	None-----	---	---	>6.0	---	---
40008: Parsons-----	D	None-----	---	---	0.5-1.5	Perched	Dec-Apr
44000: Cherokee-----	D	None-----	---	---	0.5-1.5	Perched	Dec-Jun
46001: Verdigris-----	B	Frequent----	Very brief	Dec-Jun	---	---	---
46002: Hepler-----	C	Occasional	Brief-----	Mar-Jul	1.0-3.0	Apparent	Nov-Mar
66001: Dameron-----	B	Frequent----	Very brief	Dec-May	>6.0	---	---
70000: Bona-----	B	None-----	---	---	>6.0	---	---
70006: Crelton-----	C	None-----	---	---	1.5-3.0	Perched	Dec-Apr
70007: Cliquot-----	C	None-----	---	---	3.5-4.5	Perched	Dec-Mar
70008, 70009, 70010: Goss-----	B	None-----	---	---	>6.0	---	---
70012: Hoberg-----	C	None-----	---	---	1.0-3.0	Perched	Dec-Mar

Table 20.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Flooding			High water table		
		Frequency	Duration	Months	Depth Ft	Kind	Months
70014:							
Moko-----	D	None-----	---	---	>6.0	---	---
Rock outcrop.							
70040:							
Cliquot-----	C	None-----	---	---	3.5-4.5	Perched	Dec-Mar
Bolivar-----	B	None-----	---	---	>6.0	---	---
70041, 70042:							
Goss-----	B	None-----	---	---	>6.0	---	---
70043:							
Sonsac-----	B	None-----	---	---	>6.0	---	---
Moko-----	D	None-----	---	---	>6.0	---	---
Rock outcrop.							
70044:							
Sonsac-----	B	None-----	---	---	>6.0	---	---
Moko-----	D	None-----	---	---	>6.0	---	---
70045:							
Keeno-----	C	None-----	---	---	1.5-2.5	Perched	Dec-Mar
70047:							
Wanda-----	B	None-----	---	---	>6.0	---	---
70048:							
Alsup-----	C	None-----	---	---	2.5-4.0	Perched	Dec-Mar
73000:							
Pomme-----	B	None-----	---	---	>6.0	---	---
73008:							
Viraton-----	C	None-----	---	---	1.5-2.5	Perched	Dec-May
73010:							
Wilderness-----	C	None-----	---	---	1.0-2.0	Perched	Dec-Mar
73031:							
Gerald-----	D	None-----	---	---	1.0-2.0	Perched	Dec-Apr
73059:							
Pomme-----	B	None-----	---	---	>6.0	---	---
73065:							
Wilderness-----	C	None-----	---	---	1.0-2.0	Perched	Dec-Mar
73075:							
Hobson-----	C	None-----	---	---	1.5-3.0	Perched	Dec-May
74625:							
Hartville-----	C	None-----	---	---	1.5-3.0	Perched	Jan-Apr
74641:							
Secesh-----	B	Occasional	Very brief	Nov-Apr	>6.0	---	---

Table 20.--Water Features--Continued

Map symbol and soil name	Hydro-	Flooding			High water table		
	logic| group|	Frequency	Duration	Months	Depth	Kind	Months
					<u>Ft</u>		
75378:							
Sturkie-----	B	Frequent----	Brief-----	Dec-Apr	>6.0	---	---
99000.							
Pits, quarries							
99001.							
Water							
99004:							
Kanima-----	C	None-----	---	---	>6.0	---	---

Table 21.--Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Restrictive layer				Potential	Risk of corrosion	
	Kind	Depth	Thickness	Hardness	for frost action	Uncoated steel	Concrete
		to top					
		In	In				
15003: Basehor-----	Bedrock (lithic)	10-20	60-70	Very strongly cemented	Moderate	Low	Moderate
Rock outcrop.							
15004: Basehor-----	Bedrock (lithic)	10-20	60-70	Very strongly cemented	Moderate	Low	Moderate
40000: Barden-----	---	---	---	---	None	High	Moderate
40003: Woodson-----	---	---	---	---	Low	High	Moderate
40004: Barden-----	---	---	---	---	None	High	Moderate
40005: Sylvania-----	Bedrock (paralithic)	40-60	6-40	Moderately cemented	None	Low	Moderate
40006: Barco-----	Bedrock (paralithic)	20-40	2-60	Moderately cemented	None	Low	Moderate
Sylvania-----	Bedrock (paralithic)	40-60	4-40	Moderately cemented	Moderate	High	High
40007: Eldorado-----	---	---	---	---	None	High	Moderate
40008: Parsons-----	---	---	---	---	None	High	Moderate
44000: Cherokee-----	---	---	---	---	None	High	Moderate
46001: Verdigris-----	---	---	---	---	Low	Low	Low
46002: Hepler-----	---	---	---	---	Low	High	Moderate
66001: Dameron-----	---	---	---	---	Moderate	Low	Low
70000: Bona-----	Bedrock (lithic)	60-80	---	Indurated	Moderate	High	Moderate
70006: Crelton-----	Fragipan	18-35	6-30	Noncemented	Moderate	High	High
70007: Cliquot-----	Bedrock (paralithic)	40-60	4-40	Moderately cemented	Moderate	High	High
70008, 70009, 70010: Goss-----	---	---	---	---	Moderate	Moderate	Moderate

Table 21.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth	Thickness	Hardness		Uncoated steel	Concrete
		to top	In				
		In	In				
70012: Hoberg-----	Fragipan	20-36	11-35	Noncemented	Moderate	Moderate	High
70014: Moko-----	Bedrock (lithic)	4-20	60-76	Indurated	None	Low	Low
Rock outcrop-----	Bedrock (lithic)	0-0	80-80	Indurated	---	---	---
70040: Cliquot-----	Bedrock (paralithic)	40-60	4-40	Moderately cemented	Moderate	High	High
Bolivar-----	Bedrock (paralithic)	20-40	10-20	Moderately cemented	None	Low	Moderate
70041, 70042: Goss-----	---	---	---	---	Moderate	Moderate	Moderate
70043: Sonsac-----	Bedrock (lithic)	20-40	40-60	Indurated	Moderate	Moderate	Moderate
Moko-----	Bedrock (lithic)	4-20	60-76	Indurated	None	Low	Low
Rock outcrop-----	Bedrock (lithic)	0-0	60-80	Indurated	None	---	---
70044: Sonsac-----	Bedrock (lithic)	20-40	40-60	Indurated	Moderate	Moderate	Moderate
Moko-----	Bedrock (lithic)	4-20	60-76	Indurated	None	Low	Low
70045: Keeno-----	Fragipan	18-36	6-30	Noncemented	Moderate	Moderate	High
70047: Wanda-----	---	---	---	---	Moderate	Low	Moderate
70048: Alsup-----	Bedrock (paralithic)	40-60	4-40	Moderately cemented	Moderate	High	Moderate
73000: Pomme-----	---	---	---	---	Low	Moderate	Moderate
73008: Viraton-----	Fragipan	18-33	8-30	Noncemented	Moderate	Moderate	High
73010: Wilderness-----	Fragipan	15-29	6-14	Noncemented	Moderate	Moderate	High
73031: Gerald-----	Fragipan	20-40	15-36	Noncemented	High	High	High
73059: Pomme-----	---	---	---	---	Low	Moderate	Moderate
73065: Wilderness-----	Fragipan	15-29	6-14	Noncemented	Moderate	Moderate	High
73075: Hobson-----	Fragipan	18-27	6-24	Noncemented	Moderate	Moderate	High
74625: Hartville-----	---	---	---	---	High	Moderate	Moderate

Table 21.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Potential	Risk of corrosion	
	Kind	Depth	Thickness	Hardness	for	Uncoated steel	Concrete
		to top			frost action		
		<u>In</u>	<u>In</u>				
74641: Secesh-----	---	---	---	---	Moderate	Low	Moderate
75378: Sturkie-----	---	---	---	---	None	Low	Low
99000. Pits, quarries							
99001. Water							
99004: Kanima-----	---	---	---	---	None	Moderate	Low

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (USDA, 1998 and 1999). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 22 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Alfisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udalf (*Ud*, meaning humid, plus *alf*, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludalfs (*Hapl*, meaning minimal horizonation, plus *udalf*, the suborder of the Alfisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludalfs.

FAMILY. Families are established within a subgroup

on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle size, mineral content, soil temperature regime, soil depth, and reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is clayey-skeletal, mixed, active, mesic Typic Hapludalfs.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (USDA, 1993). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (USDA, 1999) and in "Keys to Soil Taxonomy" (USDA, 1998). Unless otherwise indicated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Alsup Series

Depth to bedrock: Deep (40 to 60 inches)

Drainage class: Moderately well drained

Permeability: Moderately slow

Landform: Hill on upland

Position on the landform: Backslope

Parent material: Colluvium over clayey residuum from shale and siltstone

Slope range: Strongly sloping (8 to 15 percent)

Elevation: 930 feet

Taxonomic class: Fine, mixed, active, mesic Oxyaquic Hapludalfs

Typical Pedon

Alsop silt loam, 8 to 15 percent slopes, very stony, in a forest; 900 feet north and 900 feet west of the southeast corner of sec. 3, T. 32 N., R. 26 W.; USGS Crisp topographic quadrangle; UTM coordinates 4,155,340 meters N. and 432,290 meters E.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; strong fine granular structure; very friable; many fine and medium roots; 5 percent siltstone gravel; strongly acid; abrupt smooth boundary.

AE—2 to 5 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine platy structure; friable; many fine and medium roots; common fine light brownish gray (10YR 6/2) silt coats; 5 percent siltstone gravel; very strongly acid; clear smooth boundary.

E—5 to 14 inches; dark grayish brown (10YR 4/2) gravelly silt loam; moderate fine subangular blocky structure; friable; common fine and medium roots; 20 percent siltstone gravel; strongly acid; clear smooth boundary.

BE—14 to 24 inches; pale brown (10YR 6/3) very gravelly silt loam; strong fine and medium subangular blocky structure; firm; few fine roots; common fine masses of iron-manganese accumulation; 55 percent siltstone gravel; strongly acid; clear smooth boundary.

2Bt1—24 to 34 inches; reddish brown (5YR 4/4) silty clay; weak fine angular blocky structure; firm; few fine roots; few faint clay films on faces of peds; many fine light reddish brown (2.5YR 6/4) masses of iron accumulation; 10 percent siltstone gravel; strongly acid; abrupt smooth boundary.

2Bt2—34 to 50 inches; light olive brown (2.5Y 5/6) silty clay; moderate fine angular blocky structure; very firm; common prominent clay films on faces of peds; common fine masses of iron-manganese accumulation; common fine pale olive (5Y 6/4) iron depletions; 10 percent siltstone parachanners; strongly acid; gradual smooth boundary.

2Cr—50 to 60 inches; shale.

Range in Characteristics

Thickness of the ochric epipedon: 5 to 24 inches

Depth to the argillic horizon: 5 to 24 inches

Depth to the paralithic contact: 40 to 56 inches

A and AE horizons:

Color—hue of 10YR, value of 3 or 4, and chroma of 2

Redoximorphic features—none

Texture of the fine-earth fraction—silt loam

Content of rock fragments—0 to 5 percent

Reaction—strongly acid to neutral (pH 5.1 to 7.3)

E horizon:

Color—hue of 10YR, value of 4 to 7, and chroma of 2 or 3

Redoximorphic features—none

Texture of the fine-earth fraction—silt loam or loam

Content of rock fragments—0 to 30 percent

Reaction—strongly acid to neutral (pH 5.1 to 7.3)

BE horizon:

Color—hue of 10YR, value of 6, and chroma of 3

Redoximorphic features—none

Texture of the fine-earth fraction—silt loam or silty clay loam

Content of rock fragments—0 to 55 percent

Reaction—strongly acid or moderately acid (pH 5.1 to 6.0)

2Bt horizon:

Color—hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 4 or 6

Redoximorphic features—iron depletions or masses of iron accumulation

Texture of the fine-earth fraction—clay, silty clay, or silty clay loam

Content of rock fragments—0 to 12 percent

Reaction—very strongly acid to moderately acid (pH 4.5 to 6.0)

Barco Series

Depth to bedrock: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Ridge on upland

Position on the landform: Summit

Parent material: Residuum weathered from sandstone

Slope range: Gently sloping (2 to 5 percent)

Elevation: 1,030 feet

Taxonomic class: Fine-loamy, mixed, active, thermic Humic Hapludults

Typical Pedon

Barco loam, in an area of Barco-Sylvania complex, 2 to 5 percent slopes, in a pasture; 700 feet north and 1,800 feet west of the southeast corner of sec. 8, T. 32 N., R. 28 W.; USGS Jerico Springs topographic quadrangle; UTM coordinates 4,153,330 meters N. and 409,130 meters E.

A—0 to 7 inches; very dark grayish brown (10YR 3/2) loam, brown (10YR 5/3) dry; moderate fine

granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

AB—7 to 14 inches; very dark grayish brown (10YR 3/2) loam, brown (10YR 5/3) dry; weak fine subangular blocky structure; friable; many fine and medium roots; very strongly acid; clear smooth boundary.

Bt1—14 to 23 inches; dark yellowish brown (10YR 4/4) loam; weak fine subangular blocky structure; firm; common fine and medium roots; few distinct clay films on faces of peds; 5 percent sandstone gravel; very strongly acid; gradual wavy boundary.

Bt2—23 to 31 inches; yellowish brown (10YR 5/4) cobbly clay loam; moderate fine angular blocky structure; firm; few fine and medium roots; few distinct clay films on faces of peds; common fine and medium dark red (2.5YR 3/6) masses of iron accumulation; 10 percent sandstone gravel and 20 percent sandstone cobbles; very strongly acid; gradual wavy boundary.

Cr—31 to 39 inches; sandstone.

R—39 to 80 inches; sandstone.

Range in Characteristics

Thickness of the umbric epipedon: 8 to 18 inches

Depth to the argillic horizon: 8 to 18 inches

Depth to the paralithic contact: 30 to 40 inches

Depth to the lithic contact: 34 to 50 inches

Ap horizon: (where present):

Color—hue of 10YR, value of 2 or 3, and chroma of 2 or 3

Redoximorphic features—none

Texture of the fine-earth fraction—fine sandy loam or loam

Content of rock fragments—0 to 12 percent

Reaction—strongly acid to neutral (pH 5.1 to 7.3)

A horizon:

Color—hue of 10YR, value of 3, and chroma of 2 or 3

Redoximorphic features—none

Texture of the fine-earth fraction—loam

Content of rock fragments—0 to 10 percent

Reaction—strongly acid to neutral (pH 5.1 to 7.3)

AB horizon:

Color—hue of 10YR, value of 3, and chroma of 2 or 4

Redoximorphic features—none

Texture of the fine-earth fraction—loam

Content of rock fragments—0 to 5 percent

Reaction—very strongly acid or strongly acid (pH 4.5 to 5.5)

BA horizon (where present):

Color—hue of 10YR, value of 3 or 4, and chroma of 3 or 4

Redoximorphic features—none

Texture of the fine-earth fraction—fine sandy loam or loam

Content of rock fragments—0 to 5 percent

Reaction—very strongly acid or strongly acid (pH 4.5 to 5.5)

Bt horizon:

Color—hue of 2.5YR to 10YR, value of 3 to 6, and chroma of 3, 4, 6, or 8

Redoximorphic features—masses of iron accumulation

Texture of the fine-earth fraction—loam, sandy clay loam, or clay loam

Content of rock fragments—0 to 30 percent

Reaction—very strongly acid or strongly acid (pH 4.5 to 5.5)

BC horizon (where present):

Color—hue of 10YR, value of 4, and chroma of 6

Redoximorphic features—iron depletions or masses of iron accumulation

Texture of the fine-earth fraction—sandy clay loam

Content of rock fragments—0 to 50 percent

Reaction—strongly acid (pH 5.1 to 5.5)

Barden Series

Depth to bedrock: Very deep (more than 60 inches)

Drainage class: Moderately well drained

Permeability: Slow

Landform: Divide or hill on upland

Position on the landform: Summit and footslope

Parent material: Loess over residuum weathered from clayey shale

Slope range: Very gently sloping or gently sloping (1 to 5 percent)

Elevation: 1,030 feet

Taxonomic class: Fine, mixed, active, thermic Aquollic Hapludalfs

Typical Pedon

Barden silt loam, 1 to 3 percent slopes, in cropland; 300 feet east and 60 feet north of the southwest corner of sec. 34, T. 32 N., R. 28 W.; USGS Golden City topographic quadrangle; UTM coordinates 4,146,610 meters N. and 411,180 meters E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium platy structure parting to weak fine

granular; very friable; few fine roots; neutral; abrupt smooth boundary.

Bt1—8 to 14 inches; yellowish brown (10YR 5/4) silty clay loam; weak fine granular structure; very friable; few fine roots; common distinct clay films on faces of peds; common fine strong brown (7.5YR 4/6) masses of iron accumulation; very strongly acid; clear smooth boundary.

Bt2—14 to 23 inches; yellowish brown (10YR 5/4) silty clay; moderate fine subangular blocky structure; firm; few fine roots; common distinct clay films on faces of peds; common fine yellowish red (5YR 4/6) masses of iron accumulation; few fine iron-manganese concretions; common fine light brownish gray (10YR 6/2) iron depletions; very strongly acid; clear smooth boundary.

Bt3—23 to 36 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; few faint clay films on faces of peds; few fine strong brown (7.5YR 5/8) masses of iron accumulation; many fine masses of iron-manganese accumulation; common fine light brownish gray (10YR 6/2) iron depletions; 3 percent chert gravel; strongly acid; clear smooth boundary.

Bt4—36 to 44 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine angular blocky structure; firm; common distinct clay films on faces of peds; few fine dark red (2.5YR 3/6) masses of iron accumulation; many fine and medium masses of iron-manganese accumulation; common fine gray (10YR 6/1) iron depletions; 5 percent chert gravel; strongly acid; clear smooth boundary.

Bt5—44 to 54 inches; light yellowish brown (10YR 6/4) silty clay loam; moderate fine and medium angular blocky structure; firm; common distinct clay films on faces of peds; many fine and medium masses of iron-manganese accumulation; common fine gray (10YR 6/1) iron depletions; moderately acid; clear smooth boundary.

BC—54 to 68 inches; yellowish brown (10YR 5/8) and light yellowish brown (10YR 6/4) silty clay loam; moderate fine subangular blocky structure; firm; common distinct pressure faces on faces of peds; many fine and medium masses of iron-manganese accumulation; common fine and medium light brownish gray (10YR 6/2) iron depletions; moderately acid; abrupt smooth boundary.

Cr—68 to 74 inches; shale.

Range in Characteristics

Thickness of the ochric epipedon: 7 to 16 inches

Depth to the argillic horizon: 7 to 16 inches

Depth to the paralithic contact: 68 to 80 inches

Ap horizon:

Color—hue of 10YR, value of 3, and chroma of 2

Redoximorphic features—masses of iron accumulation

Texture of the fine-earth fraction—silt loam or loam

Content of rock fragments—none

Reaction—strongly acid to neutral (pH 5.1 to 7.3)

BA horizon (where present):

Color—hue of 10YR, value of 5, and chroma of 4

Redoximorphic features—masses of iron accumulation

Texture of the fine-earth fraction—loam

Content of rock fragments—none

Reaction—neutral (pH 6.6 to 7.3)

Bt horizon:

Color—hue of 10YR, value of 4 to 6, and chroma of 2, 3, 4, or 6

Redoximorphic features—iron depletions or masses of iron accumulation

Texture of the fine-earth fraction—clay loam, silty clay loam, clay, or silty clay

Content of rock fragments—0 to 5 percent

Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

BC horizon:

Color—hue of 10YR, value of 5 or 6, and chroma of 4, 6, or 8

Redoximorphic features—iron depletions

Texture of the fine-earth fraction—silty clay loam or clay loam

Content of rock fragments—none

Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

Basehor Series

Depth to bedrock: Shallow (4 to 20 inches)

Drainage class: Well drained

Permeability: Moderately rapid

Landform: Hill on upland

Position on the landform: Backslope

Parent material: Residuum weathered from sandstone

Slope range: Moderately sloping to steep (3 to 35 percent)

Elevation: 920 feet

Taxonomic class: Loamy, siliceous, superactive, mesic Lithic Dystrudepts

Typical Pedon

Basehor fine sandy loam, in an area of Basehor-Rock outcrop complex, 3 to 15 percent slopes, in a forest; 800 feet south and 4,150 feet east of the northwest

corner of sec. 11, T. 31 N., R. 26 W.; USGS Greenfield topographic quadrangle; UTM coordinates 4,144,050 meters N. and 433,340 meters E.

- A—0 to 5 inches; brown (10YR 4/3) fine sandy loam; weak fine granular structure; friable; many fine roots; moderately acid; clear smooth boundary.
 E—5 to 12 inches; brown (10YR 5/3) fine sandy loam; weak fine granular structure; friable; common fine and medium roots; slightly acid; clear smooth boundary.
 Bw—12 to 16 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine granular structure; friable; common fine roots; slightly acid; abrupt wavy boundary.
 R—16 to 80 inches; sandstone.

Range in Characteristics

Thickness of the ochric epipedon: 2 to 12 inches

Depth to the cambic horizon: 2 to 12 inches

Depth to the lithic contact: 10 to 20 inches

A or Ap horizon:

- Color—hue of 10YR, value of 4, and chroma of 3
 Texture of the fine-earth fraction—fine sandy loam
 Content of rock fragments—0 to 15 percent
 Reaction—very strongly acid to slightly acid (pH 4.5 to 6.5)

E horizon:

- Color—hue of 10YR, value of 5, and chroma of 3
 Texture of the fine-earth fraction—fine sandy loam
 Content of rock fragments—none
 Reaction—very strongly acid to slightly acid (pH 4.5 to 6.5)

Bw horizon:

- Color—hue of 7.5YR or 10YR, value of 4, and chroma of 4 or 6
 Texture of the fine-earth fraction—fine sandy loam
 Content of rock fragments—0 to 35 percent
 Reaction—very strongly acid to slightly acid (pH 4.5 to 6.5)

Bolivar Series

Depth to bedrock: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Ridge on upland

Position on the landform: Summit

Parent material: Residuum weathered from sandstone

Slope range: Moderately sloping (3 to 8 percent)

Elevation: 1,000 feet

Taxonomic class: Fine-loamy, mixed, active, thermic Ultic Hapludalfs

Typical Pedon

Cliquot fine sandy loam, in an area of Cliquot-Bolivar complex, 3 to 8 percent slopes, in a pasture; 300 feet east and 600 feet north of the southwest corner of sec. 24, T. 31 N., R. 26 W.; USGS Dadeville topographic quadrangle; UTM coordinates 4,139,610 meters N. and 433,750 meters E.

- Ap—0 to 7 inches; brown (10YR 4/3) fine sandy loam; weak fine granular structure; friable; many fine roots; 5 percent sandstone gravel; strongly acid; clear smooth boundary.
 E—7 to 10 inches; brown (10YR 5/3) fine sandy loam; moderate thin platy structure parting to weak; friable; few fine roots; common fine and medium brownish yellow (10YR 6/8) masses of iron accumulation; 5 percent sandstone gravel; strongly acid; clear smooth boundary.
 BE—10 to 13 inches; yellowish brown (10YR 5/4) fine sandy loam; moderate thin platy structure; friable; common fine and medium roots; 5 percent sandstone gravel; strongly acid; clear smooth boundary.
 Bt1—13 to 18 inches; strong brown (7.5YR 5/8) and yellowish brown (10YR 5/4) gravelly sandy clay loam; moderate very fine and fine subangular blocky structure; firm; few fine roots; few faint clay films on faces of peds; 20 percent sandstone gravel; strongly acid; clear wavy boundary.
 Bt2—18 to 26 inches; yellowish brown (10YR 5/6) and red (2.5YR 4/8) very flaggy sandy clay loam; moderate fine subangular blocky structure; firm; few fine roots matted around stones; few faint clay films on faces of peds; 45 percent sandstone flagstones; strongly acid; clear wavy boundary.
 Cr—26 to 38 inches; sandstone.
 R—38 to 80 inches; sandstone.

Range in Characteristics

Thickness of the ochric epipedon: 6 to 13 inches

Depth to the argillic horizon: 6 to 13 inches

Depth to the paralithic contact: 26 to 38 inches

Depth to the lithic contact: 38 to 44 inches

A or Ap horizon:

- Color—hue of 10YR, value of 3 or 4, and chroma of 2 or 3
 Redoximorphic features—none
 Texture of the fine-earth fraction—fine sandy loam
 Content of rock fragments—0 to 5 percent
 Reaction—strongly acid or moderately acid (pH 5.1 to 6.0)

E horizon:

- Color—hue of 10YR, value of 5, and chroma of 3

Redoximorphic features—masses of iron accumulation
 Texture of the fine-earth fraction—fine sandy loam or loam
 Content of rock fragments—0 to 5 percent
 Reaction—strongly acid (pH 5.1 to 5.5)

BE horizon:

Color—hue of 10YR, value of 5, and chroma of 4
 Redoximorphic features—none
 Texture of the fine-earth fraction—fine sandy loam
 Content of rock fragments—0 to 5 percent
 Reaction—strongly acid (pH 5.1 to 5.5)

Bt horizon:

Color—hue of 2.5YR to 10YR, value of 4 or 5, and chroma of 4, 6, or 8
 Redoximorphic features—none
 Texture of the fine-earth fraction—sandy clay loam, clay loam, or loam
 Content of rock fragments—20 to 45 percent
 Reaction—strongly acid or moderately acid (pH 5.1 to 6.0)

Bona Series

Depth to bedrock: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Ridge on upland

Position on the landform: Shoulder

Parent material: Gravelly colluvium over clayey residuum weathered from cherty limestone

Slope range: Moderately sloping (3 to 8 percent)

Elevation: 985 feet

Taxonomic class: Clayey-skeletal, mixed, semiactive, mesic Typic Paleudolls

Typical Pedon

Bona gravelly silt loam, 3 to 8 percent slopes, in a pasture; 1,425 feet west and 800 feet south of the northeast corner of sec. 21, T. 33 N., R. 23 W.; USGS Bolivar topographic quadrangle; UTM coordinates 4,159,290 meters N. and 459,800 meters E.

Ap—0 to 6 inches; very dark gray (10YR 3/1) gravelly silt loam, dark grayish brown (10YR 4/2) dry; weak medium granular structure; friable; many fine roots; 25 percent chert gravel; moderately acid; clear smooth boundary.

A—6 to 18 inches; very dark grayish brown (10YR 3/2) very gravelly silt loam, brown (10YR 5/3) dry; moderate medium granular structure; friable; many fine roots; 55 percent chert gravel; slightly acid; gradual wavy boundary.

Bt1—18 to 24 inches; dark brown (7.5YR 3/4) extremely gravelly silt loam; weak fine subangular blocky structure; friable; common fine roots; many distinct continuous clay films on faces of peds; 65 percent chert gravel and 3 percent chert cobbles; slightly acid; gradual wavy boundary.

2Bt2—24 to 30 inches; yellowish red (5YR 4/6) very gravelly clay; moderate fine subangular blocky structure; firm; common fine roots; very few distinct continuous clay films on faces of peds; 45 percent chert gravel; moderately acid; gradual wavy boundary.

3Bt3—30 to 40 inches; red (2.5YR 4/6) clay; moderate fine angular blocky structure; firm; few fine roots; very few distinct continuous clay films on faces of peds; 10 percent chert gravel; very strongly acid; gradual wavy boundary.

3Bt4—40 to 72 inches; red (2.5YR 4/6) clay; moderate fine angular blocky structure; firm; few fine roots; very few distinct continuous clay films on faces of peds; common yellowish red (5YR 5/8) masses of iron accumulation; 10 percent chert gravel; very strongly acid; abrupt wavy boundary.

3R—72 to 80 inches; dolostone.

Range in Characteristics

Thickness of the mollic epipedon: 14 to 18 inches

Depth to the argillic horizon: 10 to 25 inches

Depth to the lithic horizon: 62 to 80 inches

Depth to the 2Bt horizon: 15 to 25 inches

Depth to the 3Bt horizon: 30 to 45 inches

Ap and A horizons:

Color—hue of 10YR, value of 3, and chroma of 1 or 2

Redoximorphic features—none

Texture of the fine-earth fraction—silt loam

Content of rock fragments—20 to 55 percent

Reaction—strongly acid to slightly acid (pH 5.1 to 6.5)

Bt horizon:

Color—hue of 2.5YR to 10YR, value of 3 or 4, and chroma of 3, 4, or 6

Redoximorphic features—masses of iron accumulation

Texture of the fine-earth fraction—silty clay loam or silt loam

Content of rock fragments—60 to 75 percent

Reaction—strongly acid to slightly acid (pH 5.1 to 6.5)

2Bt horizon:

Color—hue of 2.5YR to 7.5YR, value of 3 or 4, and chroma of 4 or 6

Redoximorphic features—masses of iron accumulation

Texture of the fine-earth fraction—clay or silty clay

Content of rock fragments—35 to 55 percent

Reaction—very strongly acid to slightly acid (pH 4.5 to 6.5)

3Bt horizon:

Color—hue of 2.5YR or 5YR, value of 4, and chroma of 4 or 6

Redoximorphic features—masses of iron accumulation

Texture of the fine-earth fraction—clay or silty clay

Content of rock fragments—0 to 15 percent

Reaction—very strongly acid to slightly acid (pH 4.5 to 6.5)

Cherokee Series

Depth to bedrock: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Permeability: Very slow

Landform: Paleoterrace on river valley

Position on the landform: Toeslope

Parent material: Loess over silty and clayey colluvium

Slope range: Level (0 to 1 percent)

Elevation: 970 feet

Taxonomic class: Fine, mixed, active, thermic Typic Albaqualfs

Typical Pedon

Cherokee silt loam, 0 to 1 percent slope, in cropland; 2,400 feet south and 950 feet east of the northwest corner of sec. 6, T. 32 N., R. 28 W.; USGS Jerico Springs topographic quadrangle; UTM coordinates 4,155,630 meters N. and 406,840 meters E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; strong fine granular structure; very friable; many fine roots; few fine yellowish brown (10YR 5/6) masses of iron accumulation; neutral; abrupt smooth boundary.

E—7 to 13 inches; grayish brown (10YR 5/2) silt loam; moderate very fine granular structure; friable; many fine roots; few fine yellowish brown (10YR 5/6) masses of iron accumulation; slightly acid; clear smooth boundary.

Btg1—13 to 21 inches; gray (10YR 5/1) clay; moderate fine subangular blocky structure; firm; common fine roots; common distinct clay films on faces of peds; few fine red (2.5YR 4/6) and dark yellowish brown (10YR 4/6) masses of iron accumulation; very strongly acid; clear wavy boundary.

Btg2—21 to 32 inches; dark gray (10YR 4/1) clay; moderate fine subangular blocky structure; firm;

common fine roots; common distinct clay films on faces of peds; common fine red (2.5YR 4/6) and few fine yellowish brown (10YR 5/6) masses of iron accumulation; few fine iron-manganese concretions; very strongly acid; clear smooth boundary.

2Btg3—32 to 42 inches; grayish brown (10YR 5/2) silty clay; moderate medium subangular blocky structure parting to weak fine angular blocky; firm; few fine roots; common distinct clay films on faces of peds; few fine reddish yellow (5YR 6/8) and red (2.5YR 4/8) masses of iron accumulation; few fine masses of iron-manganese accumulation; strongly acid; gradual irregular boundary.

2Btg4—42 to 52 inches; gray (10YR 5/1) silty clay loam; strong fine and medium subangular blocky structure; firm; few faint clay films on faces of peds; few fine yellowish brown (10YR 5/8) masses of iron accumulation; few fine masses of iron-manganese accumulation; strongly acid; gradual irregular boundary.

2BCg—52 to 70 inches; gray (10YR 5/1) silty clay loam; strong fine and medium subangular blocky structure; firm; common fine yellowish brown (10YR 5/4) and many medium yellowish brown (10YR 5/8) masses of iron accumulation; common fine and medium masses of iron-manganese accumulation; strongly acid.

Range in Characteristics

Thickness of the ochric epipedon: 6 to 13 inches

Depth to the argillic horizon: 10 to 18 inches

Depth to the abrupt texture change: 10 to 18 inches

Depth to the albic horizon: 4 to 10 inches

Ap horizon:

Color—hue of 10YR, value of 4, and chroma of 2

Redoximorphic features—masses of iron accumulation or masses of iron-manganese accumulation

Texture of the fine-earth fraction—silt loam

Content of rock fragments—0 to 5 percent

Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

E horizon:

Color—hue of 10YR, value of 4 or 5, and chroma of 2

Redoximorphic features—masses of iron accumulation or masses of iron-manganese accumulation

Texture of the fine-earth fraction—silt loam

Content of rock fragments—0 to 5 percent

Reaction—very strongly acid to slightly acid (pH 4.5 to 6.5)

Btg horizon:

Color—hue of 10YR, value of 4 or 5, and chroma of 1 or 2
 Redoximorphic features—masses of iron accumulation
 Texture of the fine-earth fraction—silty clay or clay
 Content of rock fragments—0 to 5 percent
 Reaction—very strongly acid to moderately acid (pH 4.5 to 6.0)

2Btg horizon:

Color—hue of 10YR, value of 4 or 5, and chroma of 1 or 2
 Redoximorphic features—masses of iron accumulation
 Texture of the fine-earth fraction—silty clay loam, silty clay, or clay
 Content of rock fragments—0 to 5 percent
 Reaction—strongly acid or moderately acid (pH 5.1 to 6.0)

2BCg horizon:

Color—hue of 10YR, value of 4, and chroma of 2
 Redoximorphic features—masses of iron accumulation
 Texture of the fine-earth fraction—silty clay loam, silty clay, or clay
 Content of rock fragments—0 to 5 percent
 Reaction—strongly acid or moderately acid (pH 5.1 to 6.0)

2Cg horizon (where present):

Color—hue of 10YR, value of 5, and chroma of 1
 Redoximorphic features—masses of iron accumulation
 Texture of the fine-earth fraction—silty clay loam
 Content of rock fragments—none
 Reaction—strongly acid (pH 5.1 to 5.5)

Cliquot Series

Depth to bedrock: Deep (40 to 60 inches)

Drainage class: Moderately well drained

Permeability: Slow

Landform: Hill or ridge on upland

Position on the landform: Backslope or summit

Parent material: Colluvium over clayey residuum weathered from sandstone and shale

Slope range: Moderately sloping or strongly sloping (3 to 15 percent)

Elevation: 1,060 feet

Taxonomic class: Fine, mixed, semiactive, mesic Oxyaquic Hapludults

Typical Pedon

Cliquot gravelly loam, 8 to 15 percent slopes, in wooded area; 500 feet east and 225 feet south of the northwest corner of sec. 36, T. 31 N., R. 26 W.; USGS Dadeville topographic quadrangle; UTM coordinates 4,137,730 meters N. and 433,710 meters E.

A—0 to 5 inches; very dark grayish brown (10YR 3/2) gravelly loam; weak fine granular structure; very friable; common fine roots; 20 percent sandstone gravel; strongly acid; clear smooth boundary.

E—5 to 14 inches; yellowish brown (10YR 5/4) very gravelly loam; moderate fine granular structure; friable; common fine roots; 30 percent sandstone gravel and 10 percent sandstone flagstones; strongly acid; clear wavy boundary.

BE—14 to 26 inches; yellowish brown (10YR 5/4) gravelly loam; weak fine subangular blocky structure; firm; common medium roots; 20 percent sandstone gravel and 5 percent sandstone flagstones; strongly acid; gradual wavy boundary.

2Bt1—26 to 41 inches; yellowish brown (10YR 5/6) and light olive brown (2.5Y 5/4) channery silty clay loam; moderate medium subangular blocky structure; firm; common fine roots; common prominent clay films on faces of peds; 20 percent sandstone channers; very strongly acid; gradual smooth boundary.

2Bt2—41 to 49 inches; yellowish red (5YR 5/6) channery silty clay loam; moderate fine angular blocky structure; firm; common fine roots; many prominent clay films on faces of peds; 15 percent shale channers; very strongly acid; gradual smooth boundary.

2Bt3—49 to 55 inches; light brownish gray (2.5Y 6/2) and strong brown (7.5YR 5/6) channery silty clay; moderate fine angular blocky structure; firm; few fine roots; many prominent clay films on faces of peds; 20 percent shale channers; very strongly acid; clear wavy boundary.

2Cr—55 to 63 inches; shale.

2R—63 to 80 inches; shale.

Range in Characteristics

Thickness of the ochric epipedon: 6 to 26 inches

Depth to the argillic horizon: 6 to 26 inches

Depth to the 2Bt horizon: 6 to 36 inches

Depth to the paralithic contact: 40 to 60 inches

Depth to the lithic contact: 48 to 80 inches

A or Ap horizon:

Color—hue of 10YR, value of 3, and chroma of 2 or 3

Redoximorphic features—none

Texture of the fine-earth fraction—loam or fine sandy loam
 Content of rock fragments—5 to 25 percent
 Reaction—very strongly acid to moderately acid (pH 4.5 to 6.0)

E horizon:

Color—hue of 10YR, value of 3 or 5, and chroma of 4 or 6
 Redoximorphic features—none
 Texture of the fine-earth fraction—fine sandy loam or loam
 Content of rock fragments—25 to 50 percent
 Reaction—very strongly acid to moderately acid (pH 4.5 to 6.0)

BE horizon:

Color—hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 or 6
 Redoximorphic features—none
 Texture of the fine-earth fraction—fine sandy loam, loam, or silt loam
 Content of rock fragments—25 to 55 percent
 Reaction—very strongly acid to moderately acid (pH 4.5 to 6.0)

2Bt horizon:

Color—hue of 2.5YR to 2.5Y, value of 4 to 6, and chroma of 2, 3, 4, 6, or 8
 Redoximorphic features—none
 Texture of the fine-earth fraction—silty clay loam, silty clay, or clay
 Content of rock fragments—0 to 35 percent
 Reaction—very strongly acid or strongly acid (pH 4.5 to 5.5)

Creldon Series

Depth to bedrock: Very deep (more than 60 inches)

Drainage class: Moderately well drained

Permeability: Moderately slow above the fragipan; very slow in the fragipan

Landform: Divide on upland

Position on the landform: Summit

Parent material: Loess over gravelly colluvium over clayey residuum weathered from cherty limestone

Slope range: Very gently sloping (1 to 3 percent)

Elevation: 1,140 feet

Taxonomic class: Fine, mixed, active, mesic Oxyaquic Fragiudalfs

Typical Pedon

Creldon silt loam, 1 to 3 percent slopes, in cropland; 2,500 feet south and 150 feet east of the northwest

corner of sec. 26, T. 30 N., R. 28 W.; USGS Kings Point topographic quadrangle; UTM coordinates 4,129,590 meters N. and 412,200 meters E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common fine roots; 5 percent chert gravel; neutral; clear smooth boundary.

Bt1—8 to 12 inches; brown (10YR 4/3) silty clay; pale brown (10YR 6/3) dry; weak very fine and fine subangular blocky structure; friable; common fine roots; few faint patchy clay films on faces of peds; few fine brown (10YR 4/3) masses of iron accumulation; 5 percent chert gravel; slightly acid; clear wavy boundary.

Bt2—12 to 19 inches; brown (10YR 4/3) clay; moderate fine subangular blocky structure; firm; common fine roots; common distinct clay films; many fine brown (7.5YR 4/4) masses of iron accumulation; 5 percent chert gravel; slightly acid; clear smooth boundary.

Bt3—19 to 27 inches; dark yellowish brown (10YR 4/4) silty clay; moderate very fine subangular blocky structure; firm; few fine roots; many distinct clay films on faces of peds; few fine brown (7.5YR 4/4) masses of iron accumulation; 10 percent chert gravel; slightly acid; clear wavy boundary.

2Btx—27 to 37 inches; grayish brown (10YR 5/2) very gravelly silt loam; moderate very coarse prismatic structure parting to weak fine subangular blocky; very firm, brittle; few faint clay films on rock fragments; 55 percent chert gravel; strongly acid; clear wavy boundary.

3Bt—37 to 60 inches; red (2.5YR 4/6) very gravelly clay; moderate fine subangular blocky structure; very firm; common distinct clay films on faces of peds; common coarse yellowish brown (10YR 5/6) masses of iron accumulation; 40 percent chert gravel; slightly acid.

Range in Characteristics

Thickness of the ochric epipedon: 8 to 14 inches

Depth to the argillic horizon: 8 to 25 inches

Depth to the 3Bt horizon: 37 to 55 inches

Depth to the fragipan horizon: 18 to 35 inches

Ap horizon:

Color—hue of 10YR, value of 3, and chroma of 2 or 3

Redoximorphic features—masses of iron accumulation

Texture of the fine-earth fraction—silt loam

Content of rock fragments—0 to 5 percent
 Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

BA horizon (where present):

Color—hue of 10YR, value of 3 or 6, and chroma of 2 or 4
 Redoximorphic features—masses of iron accumulation
 Texture of the fine-earth fraction—silty clay loam
 Content of rock fragments—none
 Reaction—very strongly acid to slightly acid (pH 4.5 to 6.5)

Bt horizon:

Color—hue of 5YR to 10YR, value of 3 to 5, and chroma of 2, 3, 4, or 6
 Redoximorphic features—iron depletions or masses of iron accumulation
 Texture of the fine-earth fraction—silty clay loam, clay, or silty clay
 Content of rock fragments—0 to 12 percent
 Reaction—very strongly acid to slightly acid (pH 4.5 to 6.5)

2Btx horizon:

Color—hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 2, 3, 4, or 6
 Redoximorphic features—iron depletions
 Texture of the fine-earth fraction—silt loam or silty clay loam
 Content of rock fragments—20 to 60 percent
 Reaction—extremely acid to strongly acid (pH 3.5 to 5.5)

3Bt horizon:

Color—hue of 2.5YR to 7.5YR, value of 3 to 5, and chroma of 4, 6, or 8
 Redoximorphic features—iron depletions or masses of iron accumulation
 Texture of the fine-earth fraction—clay
 Content of rock fragments—12 to 70 percent
 Reaction—very strongly acid to slightly acid (pH 4.5 to 6.5)

Dameron Series

Depth to bedrock: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Flood plain on river valley

Parent material: Alluvium

Slope range: Nearly level or very gently sloping (0 to 3 percent)

Elevation: 950 feet

Taxonomic class: Fine-loamy, mixed, superactive, mesic Cumulic Hapludolls

Typical Pedon

Dameron silt loam, 0 to 3 percent slopes, frequently flooded, in a pasture; 3,200 feet north and 2,800 feet west of the southeast corner of sec. 12, T. 31 N., R. 25 W.; USGS Dadeville topographic quadrangle; UTM coordinates 4,143,030 meters N. and 444,570 meters E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; many fine roots; strongly acid; clear smooth boundary.

A—9 to 15 inches; very dark grayish brown (10YR 3/2) silty clay loam, brown (10YR 5/3) dry; weak fine granular structure; friable; many fine roots; moderately acid; clear smooth boundary.

Bw1—15 to 24 inches; dark brown (7.5YR 3/2) very gravelly clay loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure; firm; common fine roots; 40 percent chert gravel; moderately acid; abrupt smooth boundary.

Bw2—24 to 48 inches; very dark brown (10YR 2/2) gravelly silty clay loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure; firm; few fine roots; 20 percent chert gravel; moderately acid; abrupt smooth boundary.

Bw3—48 to 60 inches; very dark brown (10YR 2/2) gravelly silty clay loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure; firm; few fine roots; 20 percent chert gravel; moderately acid; clear smooth boundary.

Bw4—60 to 72 inches; very dark brown (10YR 2/2) silty clay loam; weak fine subangular blocky structure; firm; few fine roots; slightly acid; clear smooth boundary.

Bw5—72 to 80 inches; very dark brown (10YR 2/2) extremely gravelly clay loam; weak fine subangular blocky structure; firm; few fine roots; 65 percent chert gravel; slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 70 to 80 inches

Ap horizon:

Color—hue of 10YR, value of 3, and chroma of 2

Texture of the fine-earth fraction—silt loam

Content of rock fragments—none

Reaction—strongly acid to neutral (pH 5.1 to 7.3)

A horizon:

Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 2

Texture of the fine-earth fraction—silt loam or silty clay loam

Content of rock fragments—0 to 10 percent

Reaction—strongly acid to neutral (pH 5.1 to 7.3)

Bw horizon:

Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 2

Texture of the fine-earth fraction—clay loam or silty clay loam

Content of rock fragments—0 to 65 percent

Reaction—strongly acid to neutral (pH 5.1 to 7.3)

2Bw horizon (where present):

Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 or 2

Texture of the fine-earth fraction—loam, clay loam, or silty clay loam

Content of rock fragments—20 to 55 percent

Reaction—moderately acid (pH 5.6 to 6.0)

Eldorado Series

Depth to bedrock: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Hill on upland

Position on the landform: Shoulder

Parent material: Gravelly colluvium over clayey residuum weathered from cherty limestone

Slope range: Moderately sloping or strongly sloping (3 to 15 percent)

Elevation: 1,010 feet

Taxonomic class: Loamy-skeletal, mixed, active, thermic Typic Paleudolls

Typical Pedon

Eldorado gravelly loam, 3 to 15 percent slopes, very stony, in a pasture; 2,400 feet south and 600 feet east of the northwest corner of sec. 7, T. 31 N., R. 27 W.; USGS Lockwood topographic quadrangle; UTM coordinates 4,144,050 meters N. and 416,020 meters E.

A—0 to 8 inches; very dark grayish brown (10YR 3/2) gravelly loam, brown (10YR 5/3) dry; moderate fine granular structure; very friable; common fine and medium roots; 15 percent chert gravel and 5 percent chert cobbles; moderately acid; clear smooth boundary.

A2—8 to 13 inches; dark brown (7.5YR 3/2) cobbly loam, brown (7.5YR 5/2) dry; weak fine subangular blocky structure; friable; common fine and medium roots; 10 percent chert gravel and 10 percent chert cobbles; slightly acid; clear smooth boundary.

Bt1—13 to 22 inches; brown (7.5YR 4/3) very cobbly clay loam; moderate fine subangular blocky structure; firm; common fine and medium roots; few distinct clay films on faces of peds; few fine and medium iron-manganese concretions; 15 percent chert gravel and 20 percent chert cobbles; slightly acid; clear wavy boundary.

Bt2—22 to 33 inches; brown (7.5YR 4/4) very cobbly clay loam; moderate fine subangular blocky structure; firm; common fine and medium roots; common distinct clay films on faces of peds; few fine dark red (2.5YR 3/6) masses of iron accumulation; common fine and medium masses of iron-manganese accumulation; 15 percent chert gravel and 30 percent chert cobbles; slightly acid; gradual wavy boundary.

2Bt3—33 to 45 inches; yellowish red (5YR 4/6) very cobbly clay; moderate fine subangular blocky structure; firm; common fine roots; many distinct clay films on faces of peds; few fine dark red (2.5YR 3/6) and few medium strong brown (7.5YR 5/6) masses of iron accumulation; common fine masses of iron-manganese accumulation; 20 percent chert gravel and 35 percent chert cobbles; moderately acid; clear wavy boundary.

2Bt4—45 to 60 inches; strong brown (7.5YR 5/6) cobbly clay; moderate fine angular blocky structure; firm; few fine roots; many distinct clay films on faces of peds; few fine dark red (2.5YR 3/6) masses of iron accumulation; common fine masses of iron-manganese accumulation; 5 percent chert gravel, 15 percent chert cobbles, and 10 percent chert stones; slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 13 to 17 inches

Depth to the argillic horizon: 6 to 13 inches

Ap horizon (where present):

Color—hue of 10YR, value of 2, and chroma of 2

Redoximorphic features—none

Texture of the fine-earth fraction—silt loam

Content of rock fragments—20 to 30 percent

Reaction—moderately acid (pH 5.6 to 6.0)

A horizon:

Color—hue of 7.5YR or 10YR, value of 3, and chroma of 2

Redoximorphic features—none

Texture of the fine-earth fraction—loam or silt loam

Content of rock fragments—20 to 40 percent

Reaction—moderately acid or slightly acid (pH 5.6 to 6.5)

Bt horizon:

Color—hue of 2.5YR to 10YR, value of 3 to 6, and chroma of 3, 4, 6, or 8
 Redoximorphic features—masses of iron accumulation
 Texture of the fine-earth fraction—silty clay loam or clay loam
 Content of rock fragments—35 to 65 percent
 Reaction—moderately acid or slightly acid (pH 5.6 to 6.5)

2Bt horizon:

Color—hue of 5YR or 7.5YR, value of 4 or 6, and chroma of 4, 6, or 8
 Redoximorphic features—none
 Texture of the fine-earth fraction—clay or silty clay loam
 Content of rock fragments—25 to 65 percent
 Reaction—moderately acid or slightly acid (pH 5.6 to 6.5)

2BC horizon (where present):

Color—hue of 5YR, value of 5, and chroma of 6
 Redoximorphic features—none
 Texture of the fine-earth fraction—clay loam or clay
 Content of rock fragments—60 percent
 Reaction—strongly acid (pH 5.1 to 5.5)

Gerald Series

Depth to bedrock: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Permeability: Very slow

Landform: Divide on upland

Position on the landform: Summit

Parent material: Loess over gravelly colluvium over clayey residuum weathered from cherty limestone

Slope range: Nearly level (0 to 2 percent)

Elevation: 1,105 feet

Taxonomic class: Fine, mixed, active, mesic Aeric Fragiqualfs

Typical Pedon

Gerald silt loam, 0 to 2 percent slopes, in an old field; 2,500 feet south and 150 feet west of the southeast corner of sec. 23, R. 31 N., R. 27 W.; USGS Greenfield topographic quadrangle; UTM coordinates 4,139,870 meters N. and 423,100 meters E.

Ap1—0 to 6 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common very fine and fine roots; few fine dark yellowish brown (10YR 4/4) masses of iron accumulation; moderately acid; clear smooth boundary.

Ap2—6 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; weak thin platy structure parting to weak fine granular; friable; common fine roots; few fine yellowish brown (10YR 5/6) masses of iron accumulation; moderately acid; clear smooth boundary.

E—11 to 16 inches; gray (10YR 6/1) silt loam; weak thin platy structure parting to moderate medium granular; friable; common fine roots; few fine brownish yellow (10YR 6/8) masses of iron accumulation; slightly acid; abrupt smooth boundary.

Bt1—16 to 25 inches; dark grayish brown (10YR 4/2) silty clay; weak fine subangular blocky structure parting to weak fine angular blocky; firm; common very fine roots; common distinct clay films on faces of peds; many fine dark yellowish brown (10YR 4/4) masses of iron accumulation; few fine iron-manganese concretions; slightly acid; gradual wavy boundary.

Bt2—25 to 33 inches; grayish brown (10YR 5/2) and yellowish brown (10YR 5/4) silty clay; weak fine angular blocky structure parting to weak fine subangular blocky; firm; common very fine roots; common distinct clay films on faces of peds; many fine yellowish brown (10YR 5/8) masses of iron accumulation; few fine iron-manganese concretions; 5 percent chert gravel; slightly acid; gradual wavy boundary.

2Btx1—33 to 40 inches; light brownish gray (10YR 6/2) gravelly silty clay loam; moderate very coarse prismatic structure parting to moderate medium subangular blocky; brittle; few distinct clay films on faces of peds; few fine brownish yellow (10YR 6/8) masses of iron accumulation; few fine iron-manganese concretions; 15 percent chert gravel; neutral; gradual wavy boundary.

2Btx2—40 to 49 inches; light gray (10YR 7/1) gravelly silty clay loam; moderate very coarse prismatic structure parting to weak fine subangular blocky; brittle; few distinct clay films on vertical faces of peds; few fine brownish yellow (10YR 6/8) masses of iron accumulation; few fine iron-manganese concretions; 15 percent chert gravel; neutral; gradual wavy boundary.

3Bt1—49 to 56 inches; light brownish gray (2.5Y 6/2) cobbly silty clay loam; moderate fine subangular blocky structure; firm; common distinct clay films on faces of peds; common fine and medium dark yellowish brown (10YR 4/4) masses of iron accumulation; common fine iron-manganese concretions; 10 percent chert gravel and 10

percent chert cobbles; neutral; gradual smooth boundary.

3Bt2—56 to 77 inches; light gray (2.5Y 7/1) cobbly clay; moderate fine subangular blocky structure; firm; common distinct clay films on faces of peds; many fine and medium brownish yellow (10YR 6/8) masses of iron accumulation; 10 percent chert gravel and 20 percent chert cobbles; neutral.

Range in Characteristics

Thickness of the umbric epipedon: 8 to 11 inches

Depth to the argillic horizon: 12 to 16 inches

Depth to the 3Bt horizon: 43 to 49 inches

Depth to the fragipan horizon: 24 to 33 inches

Depth to the albic horizon: 5 to 11 inches

Ap horizon:

Color—hue of 10YR, value of 3, and chroma of 2

Redoximorphic features—masses of iron accumulation

Texture of the fine-earth fraction—silt loam

Content of rock fragments—none

Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

E horizon:

Color—hue of 10YR, value of 5 or 6, and chroma of 1 or 2

Redoximorphic features—masses of iron accumulation

Texture of the fine-earth fraction—silt loam

Content of rock fragments—none

Reaction—very strongly acid to slightly acid (pH 4.5 to 6.5)

Bt horizon:

Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4

Redoximorphic features—iron depletions or masses of iron accumulation

Texture of the fine-earth fraction—silty clay loam or silty clay

Content of rock fragments—0 to 15 percent

Reaction—very strongly acid to slightly acid (pH 4.5 to 6.5)

2Btx horizon:

Color—hue of 10YR, value of 5 to 7, and chroma of 1, 2, 3, 4, 6, or 8

Redoximorphic features—iron depletions or masses of iron accumulation

Texture of the fine-earth fraction—silty clay loam

Content of rock fragments—10 to 70 percent

Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

3Bt horizon:

Color—hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 1 or 2

Redoximorphic features—masses of iron accumulation

Texture of the fine-earth fraction—silty clay loam, silty clay, or clay

Content of rock fragments—20 to 70 percent

Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

Goss Series

Depth to bedrock: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Hill or ridge on upland

Position on the landform: Backslope or shoulder slope

Parent material: Gravelly colluvium over clayey residuum weathered from cherty limestone

Slope range: Moderately sloping to steep (3 to 35 percent)

Elevation: 965 feet

Taxonomic class: Clayey-skeletal, mixed, active, mesic Typic Paleudalfs

Typical Pedon

Goss very gravelly silt loam, 8 to 15 percent slopes, in a pasture; 900 feet north and 2,600 feet west of the southeast corner of sec. 10, T. 31 N., R. 26 W.; USGS Greenfield topographic quadrangle; UTM coordinates 4,143,050 meters N. and 431,240 meters E.

A—0 to 5 inches; brown (10YR 4/3) very gravelly silt loam; moderate fine granular structure; friable; many fine roots; 30 percent chert gravel and 5 percent chert cobbles; moderately acid; clear smooth boundary.

E—5 to 9 inches; brown (10YR 4/3) very cobbly silt loam; strong fine granular structure; friable; common fine roots; 20 percent chert gravel and 20 percent chert cobbles; neutral; clear smooth boundary.

BE—9 to 16 inches; brown (7.5YR 4/4) very cobbly silt loam; moderate fine granular structure; friable; few fine roots; 20 percent chert gravel and 30 percent chert cobbles; neutral; clear wavy boundary.

Bt1—16 to 22 inches; brown (7.5YR 4/4) very cobbly silty clay loam; weak fine subangular blocky structure; friable; few fine roots; few distinct continuous clay films on faces of peds; 20 percent chert gravel and 30 percent chert cobbles; neutral; clear smooth boundary.

Bt2—22 to 30 inches; red (2.5YR 4/6) very cobbly silty clay; moderate medium angular blocky structure; firm; common distinct continuous clay films on faces of peds; 30 percent chert gravel and 25 percent chert cobbles; slightly acid; clear smooth boundary.

2Bt3—30 to 42 inches; red (2.5YR 4/6) very cobbly clay; strong medium angular blocky structure; firm; common distinct continuous clay films on faces of peds; 30 percent chert cobbles and 10 percent chert gravel; neutral; clear smooth boundary.

2Bt4—42 to 60 inches; dark red (2.5YR 3/6) very cobbly clay; strong medium angular blocky structure; firm; common distinct discontinuous clay films on faces of peds; 50 percent chert cobbles; neutral.

Range in Characteristics

Thickness of the ochric epipedon: 10 to 16 inches

Depth to the argillic horizon: 10 to 16 inches

Depth to the 2Bt horizon: 23 to 30 inches

A or Ap horizon:

Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4

Texture of the fine-earth fraction—silt loam

Content of rock fragments—15 to 60 percent

Reaction—very strongly acid to slightly acid (pH 4.5 to 6.5)

E horizon:

Color—hue of 10YR, value of 4 or 5, and chroma of 3 or 4

Texture of the fine-earth fraction—silt loam or silty clay loam

Content of rock fragments—30 to 70 percent

Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

BE horizon:

Color—hue of 5YR to 10YR, value of 4, and chroma of 4 or 6

Texture of the fine-earth fraction—silt loam or silty clay loam

Content of rock fragments—25 to 70 percent

Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

Bt horizon:

Color—hue of 2.5YR to 7.5YR, value of 4, and chroma of 4, 6, or 8

Texture of the fine-earth fraction—silty clay loam, silty clay, or clay

Content of rock fragments—30 to 75 percent

Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

2Bt horizon:

Color—hue of 2.5YR, value of 3 or 4, and chroma of 4, 6, or 8

Texture of the fine-earth fraction—silty clay loam, silty clay, or clay

Content of rock fragments—10 to 60 percent

Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

Hartville Series

Depth to bedrock: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Permeability: Slow

Landform: Paleoterrace on river valley

Position on the landform: Footslope

Parent material: Silty alluvium over clayey colluvium

Slope range: Moderately sloping (3 to 8 percent)

Elevation: 880 feet

Taxonomic class: Fine, mixed, active, mesic Aquic Hapludalfs

Typical Pedon

Hartville silt loam, 3 to 8 percent slopes, in a pasture; 2,550 feet south and 400 feet east of the northwest corner of sec. 1, T. 32 N., R. 25 W.; USGS Aldrich topographic quadrangle; UTM coordinates 4,154,330 meters N. and 445,350 meters E.

Ap—0 to 6 inches; brown (10YR 4/3) and dark brown (10YR 3/3) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; many very fine and fine roots; common fine dark concretions; moderately acid; clear smooth boundary.

BE—6 to 10 inches; brown (10YR 4/3) and yellowish brown (10YR 5/4) silt loam; weak very fine and fine subangular blocky structure parting to moderate fine granular; friable; many very fine and fine roots; common fine and medium dark concretions; 5 percent chert gravel; moderately acid; clear smooth boundary.

Bt1—10 to 17 inches; yellowish brown (10YR 5/4) silty clay; moderate fine subangular blocky structure; firm; common very fine and fine roots; common distinct continuous brown (10YR 4/3) moist clay films on faces of peds; few fine dark concretions; many fine dark red (2.5YR 3/6) soft masses of iron accumulation; 2 percent chert gravel; strongly acid; clear smooth boundary.

Bt2—17 to 31 inches; grayish brown (10YR 5/2) silty clay; moderate fine subangular blocky structure; firm; common very fine roots; few distinct continuous brown (10YR 4/3) clay films on faces of

pedes and common distinct continuous clay films throughout; few distinct manganese or iron-manganese stains throughout; few fine dark concretions; common fine yellowish red (5YR 4/6) and many fine yellowish brown (10YR 5/6) masses of iron accumulation; 2 percent chert gravel; very strongly acid; gradual smooth boundary.

2Bt3—31 to 40 inches; light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) silty clay loam; moderate fine subangular blocky structure; firm; common very fine roots; common distinct discontinuous clay films throughout; common fine and medium dark concretions and few fine yellowish red (5YR 4/6) masses of iron accumulation; 2 percent chert gravel; moderately acid; gradual smooth boundary.

2Bt4—40 to 60 inches; light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) silty clay loam; moderate fine and medium subangular blocky structure; firm; common distinct discontinuous clay films on faces of pedes; few distinct manganese or iron-manganese stains throughout; common medium dark concretions; common fine dark yellowish brown (10YR 4/4) masses of iron accumulation; 2 percent chert gravel; neutral.

Range in Characteristics

Thickness of the ochric epipedon: 10 to 13 inches.

Depth to the argillic horizon: 10 to 13 inches.

Ap or A horizon:

Color—hue of 10YR, value of 3 or 4, and chroma of 2 or 3
Redoximorphic features—none
Texture of the fine-earth fraction—silt loam
Content of rock fragments—none
Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

BE horizon:

Color—hue of 10YR, value of 4 or 5, and chroma of 3, 4, or 6
Redoximorphic features—none
Texture of the fine-earth fraction—silt loam or silty clay loam
Content of rock fragments—0 to 5 percent
Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

Bt horizon:

Color—hue of 10YR, value of 4 to 6, and chroma of 2, 3, 4, or 6
Redoximorphic features—masses of iron accumulation
Texture of the fine-earth fraction—silty clay loam or silty clay

Content of rock fragments—0 to 5 percent
Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

2Bt horizon:

Color—hue of 10YR, value of 6, and chroma of 1
Redoximorphic features—masses of iron accumulation
Texture of the fine-earth fraction—silty clay loam, silty clay, or clay
Content of rock fragments—0 to 10 percent
Reaction—slightly acid or neutral (pH 6.1 to 7.3)

Hepler Series

Depth to bedrock: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Permeability: Moderately slow

Landform: Flood-plain step on river valley

Parent material: Silty alluvium

Slope range: Level (0 to 1 percent)

Elevation: 1,015 feet

Taxonomic class: Fine-silty, mixed, superactive, thermic Mollic Endoaqualfs

Typical Pedon

Hepler silt loam, 0 to 1 percent slope, occasionally flooded, in cropland; 200 feet east and 250 feet north of the southwest corner of sec. 25, T. 31 N., R. 29 W.; USGS Golden City topographic quadrangle; UTM coordinates 4,138,860 meters N. and 404,470 meters E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, dark brown (10YR 3/3) dry; moderate fine granular structure; friable; many fine roots; slightly alkaline; clear smooth boundary.

E—9 to 16 inches; grayish brown (2.5Y 5/2) silt loam; weak very fine subangular blocky structure; friable; few very fine and fine roots; distinct very dark grayish brown (10YR 3/2) organic coats in root channels and/or pores; distinct silt coats on faces of pedes; few coarse dark yellowish brown (10YR 4/6) masses of iron accumulation; neutral; clear smooth boundary.

Btg1—16 to 22 inches; dark gray (10YR 4/1) silt loam; moderate very fine subangular blocky structure; friable; few fine roots; distinct light brownish gray (10YR 6/2) silt coats and prominent clay films on faces of pedes; few fine dark yellowish brown (10YR 4/4) masses of iron accumulation; many medium iron-manganese concretions; neutral; gradual smooth boundary.

Btg2—22 to 33 inches; dark gray (10YR 4/1) silt loam; moderate very fine subangular blocky structure;

friable; few very fine roots; distinct light brownish gray (10YR 6/2) silt coats and prominent clay films on faces of peds; common fine dark yellowish brown (10YR 4/4) masses of iron accumulation; few coarse iron-manganese concretions; neutral; gradual smooth boundary.

Btg3—33 to 44 inches; grayish brown (10YR 5/2) silty clay loam; weak very fine subangular blocky structure; firm; few very fine roots; distinct light brownish gray (10YR 6/2) silt coats and prominent clay films on faces of peds; common fine dark yellowish brown (10YR 4/6) masses of iron accumulation; common fine iron-manganese concretions; neutral; gradual smooth boundary.

Btg4—44 to 53 inches; grayish brown (10YR 5/2) silt loam; moderate medium subangular blocky structure parting to weak fine subangular blocky; friable; few very fine roots; distinct light brownish gray (10YR 6/2) silt coats and prominent clay films on faces of peds; common fine yellowish brown (10YR 5/6) masses of iron accumulation; few fine iron-manganese concretions; slightly alkaline; gradual smooth boundary.

Btg5—53 to 60 inches; grayish brown (10YR 5/2) silty clay loam; moderate very fine subangular blocky structure; firm; few very fine roots; distinct light brownish gray (10YR 6/2) silt coats and prominent clay films on faces of peds; common fine yellowish brown (10YR 5/6) masses of iron accumulation; few fine iron-manganese concretions; few fine masses of calcium carbonate; slightly alkaline.

Range in Characteristics

Thickness of the ochric epipedon: 9 to 16 inches

Depth to the argillic horizon: 15 to 16 inches

Ap horizon:

Color—hue of 10YR, value of 3, and chroma of 2
Redoximorphic features—none
Texture of the fine-earth fraction—silt loam
Content of rock fragments—none
Reaction—neutral (pH 6.6 to 7.3)

E horizon:

Color—hue of 10YR or 2.5Y, value of 5, and chroma of 2
Redoximorphic features—masses of iron accumulation
Texture of the fine-earth fraction—silt loam
Content of rock fragments—none
Reaction—neutral (pH 6.6 to 7.3)

Btg horizon:

Color—hue of 10YR, value of 4 or 5, and chroma of 1 or 2

Redoximorphic features—iron depletions or masses of iron accumulation

Texture of the fine-earth fraction—silt loam or silty clay loam

Content of rock fragments—none

Reaction—neutral or slightly alkaline (pH 6.6 to 7.8)

Hoberg Series

Depth to bedrock: Very deep (more than 60 inches)

Drainage class: Moderately well drained

Permeability: Moderate above the fragipan; slow in the fragipan

Landform: Ridge on upland

Position on the landform: Summit

Parent material: Fine-loamy colluvium over clayey residuum weathered from cherty limestone

Slope range: Gently sloping (2 to 5 percent)

Elevation: 1,010 feet

Taxonomic class: Fine-loamy, siliceous, active, mesic Oxyaquic Fragiudalfs

Typical Pedon

Hoberg silt loam, 2 to 5 percent slopes, in a pasture; 2,400 feet east and 300 feet south of the northwest corner of sec. 3, T. 30 N., R. 26 W.; USGS South Greenfield topographic quadrangle; UTM coordinates 4,136,180 meters N. and 430,970 meters E.

Ap—0 to 7 inches; dark brown (7.5YR 3/2) silt loam, brown (7.5YR 4/4) dry; weak thin platy structure parting to moderate medium granular; friable; many fine and medium roots; 5 percent gravel; strongly acid; abrupt smooth boundary.

BA—7 to 12 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium granular structure; friable; many fine and medium roots; 5 percent gravel; moderately acid; clear smooth boundary.

Bt1—12 to 17 inches; dark brown (7.5YR 3/4) silt loam; moderate fine subangular blocky structure; friable; many fine and medium roots; few faint clay films on faces of peds; few fine iron-manganese concretions; 5 percent gravel; moderately acid; clear smooth boundary.

Bt2—17 to 26 inches; dark brown (7.5YR 3/4) gravelly silt loam; moderate very fine and fine subangular blocky structure; firm; many fine and medium roots; few faint clay films on faces of peds; 15 percent gravel and 5 percent cobbles; moderately acid; abrupt wavy boundary.

2Btx1—26 to 33 inches; strong brown (7.5YR 4/6) and dark brown (7.5YR 3/4) extremely cobbly silt loam; moderate very coarse prismatic structure parting to weak fine platy; very firm, brittle; few fine roots in

cracks; common faint clay films on faces of peds; few fine masses of iron accumulation; 40 percent gravel and 30 percent cobbles; moderately acid; gradual smooth boundary.

2Btx2—33 to 42 inches; strong brown (7.5YR 4/6) and reddish yellow (7.5YR 6/8) extremely cobbly silty clay loam; moderate very coarse prismatic structure parting to weak fine platy; very firm, brittle; common faint clay films on faces of peds; few fine masses of iron accumulation; 40 percent gravel and 30 percent cobbles; strongly acid; clear smooth boundary.

3Bt1—42 to 52 inches; dark red (2.5YR 3/6) extremely cobbly silty clay; moderate very fine angular blocky structure; firm; many distinct clay films on faces of peds; few fine masses of iron accumulation; 40 percent gravel and 35 percent cobbles; very strongly acid; clear smooth boundary.

3Bt2—52 to 62 inches; dark red (2.5YR 3/6) extremely cobbly clay; moderate fine angular blocky structure; very firm; many distinct clay films on faces of peds; few fine masses of iron accumulation; 35 percent gravel and 25 percent cobbles; strongly acid.

Range in Characteristics

Thickness of the ochric epipedon: 8 to 14 inches

Depth to the argillic horizon: 8 to 17 inches

Depth to the 3Bt horizon: 30 to 48 inches

Depth to the fragipan horizon: 20 to 36 inches

Ap horizon:

Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 2 or 3

Redoximorphic features—none

Texture of the fine-earth fraction—silt loam

Content of rock fragments—0 to 12 percent

Reaction—strongly acid to neutral (pH 5.1 to 7.3)

BA horizon:

Color—hue of 10YR, value of 3 or 4, and chroma of 2 to 4

Redoximorphic features—none

Texture of the fine-earth fraction—silt loam

Content of rock fragments—0 to 5 percent

Reaction—strongly acid to neutral (pH 5.1 to 7.3)

Bt horizon:

Color—hue of 5YR to 10YR, value of 3 to 5, and chroma of 3, 4, or 6

Redoximorphic features—iron depletions

Texture of the fine-earth fraction—silt loam or silty clay loam

Content of rock fragments—0 to 30 percent

Reaction—strongly acid to slightly acid (pH 5.1 to 6.5)

2Btx horizon:

Color—hue of 2.5YR to 7.5YR, value of 3 to 6, and chroma of 2, 3, 4, or 6

Redoximorphic features—iron depletions

Texture of the fine-earth fraction—silt loam or silty clay loam

Content of rock fragments—40 to 80 percent

Reaction—extremely acid to moderately acid (pH 4.5 to 6.0)

3Bt horizon:

Color—hue of 2.5YR to 7.5YR, value of 3 to 5, and chroma of 4 or 6

Redoximorphic features—none

Texture of the fine-earth fraction—silty clay or clay

Content of rock fragments—40 to 75 percent

Reaction—extremely acid to moderately acid (pH 4.5 to 6.0)

Hobson Series

Depth to bedrock: Very deep (more than 60 inches)

Drainage class: Moderately well drained

Permeability: Moderate above the fragipan; slow in the fragipan

Landform: Ridge on upland

Position on the landform: Summit

Parent material: Loamy colluvium over residuum weathered from sandstone and shale

Slope range: Very gently sloping (1 to 3 percent)

Elevation: 985 feet

Taxonomic class: Fine-loamy, siliceous, active, mesic Oxyaquic Fragiudalfs

Typical Pedon

Hobson loam, 1 to 3 percent slopes, in a pasture; 1,500 feet east and 100 feet north of the southwest corner of sec. 26, T. 32 N., R. 26 W.; USGS Greenfield topographic quadrangle; UTM coordinates 4,147,590 meters N. and 432,710 meters E.

Ap—0 to 4 inches; brown (10YR 4/3) loam; weak medium granular structure; friable; many fine roots; very strongly acid; abrupt smooth boundary.

E—4 to 8 inches; brown (10YR 5/3) and yellowish brown (10YR 5/4) loam; weak medium granular structure; friable; many fine roots; strongly acid; clear smooth boundary.

Bt1—8 to 13 inches; yellowish brown (10YR 5/4) loam; weak fine subangular blocky structure; friable; common fine roots; very few distinct clay films on faces of peds; few fine iron-manganese concretions; moderately acid; clear smooth boundary.

Bt2—13 to 19 inches; yellowish brown (10YR 5/4) and

strong brown (7.5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; common fine roots; few distinct clay films on faces of peds; few fine masses of iron-manganese accumulation; moderately acid; abrupt smooth boundary.

2Btx1—19 to 30 inches; grayish brown (10YR 5/2) loam; moderate very coarse prismatic structure parting to weak medium platy; firm, brittle; many medium roots in mat at top of horizon; very few faint clay films on vertical faces of peds; common fine and medium yellowish red (5YR 5/6) masses of iron accumulation; common fine strong brown (7.5YR 4/6) masses of iron accumulation; strongly acid; clear wavy boundary.

2Btx2—30 to 40 inches; dark red (2.5YR 3/6), gray (10YR 6/1), and brownish yellow (10YR 6/6) clay loam; moderate coarse prismatic structure parting to weak medium platy; firm, brittle; few distinct clay films on vertical faces of peds; common fine masses of iron-manganese accumulation; very strongly acid; clear smooth boundary.

3Bt1—40 to 55 inches; gray (10YR 6/1), dark red (2.5YR 3/6), and brownish yellow (10YR 6/6) clay loam; weak medium subangular blocky structure; firm; few distinct clay films on faces of peds; common fine masses of iron-manganese accumulation; very strongly acid; clear smooth boundary.

3Bt2—55 to 72 inches; dark red (2.5YR 3/6), gray (10YR 6/1), and brownish yellow (10YR 6/6) clay loam; moderate fine and medium subangular blocky structure; firm; few distinct clay films on faces of peds; common fine masses of iron-manganese accumulation; strongly acid.

Range in Characteristics

Thickness of the ochric epipedon: 7 to 12 inches

Depth to the argillic horizon: 6 to 12 inches

Depth to the 3Bt horizon: 30 to 48 inches

Depth to the fragipan horizon: 19 to 27 inches

Ap horizon:

Color—hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 or 3

Redoximorphic features—none

Texture of the fine-earth fraction—loam

Content of rock fragments—0 to 10 percent

Reaction—very strongly acid to moderately acid (pH 4.5 to 6.0)

E horizon:

Color—hue of 10YR, value of 5, and chroma of 3 or 4

Redoximorphic features—none

Texture of the fine-earth fraction—loam

Content of rock fragments—0 to 5 percent

Reaction—very strongly acid to moderately acid (pH 4.5 to 6.0)

EB or BE horizon (where present):

Color—hue of 10YR, value of 4 or 5, and chroma of 3, 4, or 6

Redoximorphic features—none

Texture of the fine-earth fraction—loam or sandy loam

Content of rock fragments—none

Reaction—very strongly acid to moderately acid (pH 4.5 to 6.0)

Bt horizon:

Color—hue of 5YR to 10YR, value of 4 or 5, and chroma of 4 or 6

Redoximorphic features—none

Texture of the fine-earth fraction—sandy clay loam, loam, or clay loam

Content of rock fragments—0 to 10 percent

Reaction—very strongly acid to moderately acid (pH 4.5 to 6.0)

2Btx horizon:

Color—hue of 2.5YR to 10YR, value of 3 to 6, and chroma of 1, 2, 3, 4, 6, or 8

Redoximorphic features—iron depletions or masses of iron accumulation

Texture of the fine-earth fraction—fine sandy loam or clay loam

Content of rock fragments—0 to 20 percent

Reaction—very strongly acid or strongly acid (pH 4.5 to 5.5)

2C horizon (where present):

Color—hue of 10YR, value of 5 or 6, and chroma of 2, 3, 4, or 6

Redoximorphic features—none

Texture of the fine-earth fraction—fine sandy loam

Content of rock fragments—0 to 30 percent

Reaction—moderately acid (pH 5.6 to 6.0)

3Bt horizon:

Color—hue of 2.5YR to 10YR, value of 3 to 6, and chroma of 1, 2, 3, 4, 6, or 8

Redoximorphic features—masses of iron accumulation

Texture of the fine-earth fraction—sandy clay loam or clay loam

Content of rock fragments—0 to 50 percent

Reaction—very strongly acid or strongly acid (pH 4.5 to 5.5)

Kanima Series

Depth to bedrock: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Hill on upland

Position on the landform: Backslope

Parent material: Loamy mine spoil or earthy fill derived from sandstone and shale

Slope range: Strongly sloping to very steep (8 to 50 percent)

Elevation: 920 feet

Taxonomic class: Loamy-skeletal, mixed, nonacid, thermic Alfic Udarents

Typical Pedon

Kanima very channery silt loam, 8 to 50 percent slopes; 300 feet north and 500 feet east of the southwest corner of sec. 32, T. 33 N., R. 28 W.; USGS Jerico Springs topographic quadrangle; UTM coordinates 4,156,420 meters N. and 408,345 meters E.

A—0 to 8 inches; very dark grayish brown (10YR 3/2) very channery silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common fine roots; 3 percent coal channers and 40 percent shale channers; slightly acid; gradual wavy boundary.

C1—8 to 24 inches; dark grayish brown (10YR 4/2) and grayish brown (10YR 5/2) extremely channery silt loam; massive; friable; common fine roots; common fragments of very dark gray (10YR 3/1) granular silt loam surface layer material and yellowish brown (10YR 5/4) silty clay loam fragments with common distinct clay films; very few distinct silt coats throughout; 45 percent shale channers, 15 percent shale flagstones, and 5 percent coal channers; moderately acid; gradual wavy boundary.

C2—24 to 60 inches; brown (10YR 4/3) and dark grayish brown (10YR 4/2) very channery silt loam; massive; friable; few fine roots; few fragments of very dark gray (10YR 3/1) granular silt loam surface layer material and common yellowish brown (10YR 5/4) silty clay loam fragments with common distinct clay films; common distinct silt coats throughout; 40 percent shale channers and 3 percent coal channers; moderately acid.

Range in Characteristics

Thickness of the ochric epipedon: 6 to 8 inches

A horizon:

Color—hue of 10YR, value of 3, and chroma of 2
Texture of the fine-earth fraction—silt loam

Content of rock fragments—40 percent

Reaction—moderately acid to moderately alkaline (pH 5.6 to 8.4)

C horizon:

Color—hue of 10YR, value of 4 or 5, and chroma of 2 or 3

Texture of the fine-earth fraction—silt loam, clay loam, loam, or silty clay loam

Content of rock fragments—40 to 60 percent

Reaction—moderately acid to moderately alkaline (pH 5.6 to 8.4)

Keeno Series

Depth to bedrock: Very deep (more than 60 inches)

Drainage class: Moderately well drained

Permeability: Moderate above the fragipan; slow in the fragipan

Landform: Ridge on upland

Position on the landform: Shoulder

Parent material: Gravelly colluvium over clayey residuum from cherty limestone

Slope range: Moderately sloping (3 to 8 percent)

Elevation: 1,135 feet

Taxonomic class: Loamy-skeletal, siliceous, active, mesic Oxyaquic Fragiudalfs

Typical Pedon

Keeno gravelly silt loam, 3 to 8 percent slopes, in cropland; 750 feet west and 200 feet north of the southeast corner of sec. 30, T. 30 N., R. 26 W.; USGS South Greenfield topographic quadrangle; UTM coordinates 4,128,390 meters N. and 426,550 meters E.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) gravelly silt loam, grayish brown (10YR 5/2) dry; strong fine granular structure; very friable; common medium roots; 10 percent chert gravel and 5 percent chert cobbles; neutral; abrupt smooth boundary.

Bt1—6 to 13 inches; dark yellowish brown (10YR 3/4) and strong brown (7.5YR 4/6) very gravelly silty clay loam; weak medium subangular blocky structure; friable; common fine roots; very few faint clay films on faces of peds; 35 percent chert gravel and 5 percent chert cobbles; neutral; clear wavy boundary.

Bt2—13 to 19 inches; brown (7.5YR 5/4) and yellowish brown (10YR 5/4) extremely gravelly silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; very few faint clay films on faces of peds; 60 percent chert gravel and

10 percent chert cobbles; strongly acid; clear wavy boundary.

Btx—19 to 29 inches; pale brown (10YR 6/3), red (2.5YR 4/8), and dark red (2.5YR 3/6) extremely gravelly silt loam; moderate very coarse prismatic structure parting to weak medium platy; very firm, brittle; few fine roots in cracks; very few faint clay films on vertical faces of peds; 50 percent chert gravel and 15 percent chert cobbles; moderately acid; clear wavy boundary.

2Bt1—29 to 45 inches; red (2.5YR 4/6), dark red (2.5YR 3/6), and grayish brown (10YR 5/2) extremely gravelly silty clay loam; moderate fine and medium subangular blocky structure; firm; very few faint clay films on faces of peds; 60 percent chert gravel and 20 percent chert cobbles; strongly acid; clear wavy boundary.

2Bt2—45 to 60 inches; dark red (2.5YR 3/6), reddish brown (2.5YR 4/4), and light yellowish brown (10YR 6/4) very gravelly clay; strong medium subangular blocky structure; firm; very few faint clay films on faces of peds; 45 percent chert gravel and 10 percent chert cobbles; strongly acid.

Range in Characteristics

Depth to the argillic horizon: 6 to 30 inches

Depth to the 2Bt horizon: 29 to 38 inches

Depth to the fragipan horizon: 18 to 36 inches

Ap horizon:

Color—hue of 10YR, value of 3, and chroma of 2
Redoximorphic features—none
Texture of the fine-earth fraction—loam or silt loam
Content of rock fragments—15 to 30 percent
Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

A horizon (where present):

Color—hue of 10YR, value of 3, and chroma of 2
Redoximorphic features—none
Texture of the fine-earth fraction—silt loam
Content of rock fragments—15 to 30 percent
Reaction—strongly acid to neutral (pH 5.1 to 7.3)

BA horizon (where present):

Color—hue of 10YR, value of 3 or 4, and chroma of 3 or 4
Redoximorphic features—none
Texture of the fine-earth fraction—loam or silt loam
Content of rock fragments—25 to 60 percent
Reaction—very strongly acid to moderately acid (pH 4.5 to 6.0)

Bt horizon:

Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3, 4, or 6

Redoximorphic features—masses of iron accumulation

Texture of the fine-earth fraction—silty clay loam

Content of rock fragments—35 to 70 percent

Reaction—extremely acid to slightly acid (pH 3.5 to 6.5)

Btx horizon:

Color—hue of 2.5YR to 10YR, value of 3 to 6, and chroma of 2, 3, 4, 6, or 8

Redoximorphic features—masses of iron accumulation

Texture of the fine-earth fraction—silt loam or silty clay loam

Content of rock fragments—20 to 65 percent

Reaction—extremely acid to strongly acid (pH 3.5 to 5.5)

2Bt horizon:

Color—hue of 10R, 2.5YR, or 10YR, value of 3 or 4, and chroma of 4 or 6

Redoximorphic features—iron depletions or masses of iron accumulation

Texture of the fine-earth fraction—silty clay or clay

Content of rock fragments—40 to 80 percent

Reaction—very strongly acid or strongly acid (pH 4.5 to 5.5)

Moko Series

Depth to bedrock: Shallow (4 to 20 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Hill on upland

Position on the landform: Backslope

Parent material: Gravelly residuum weathered from cherty limestone

Slope range: Moderately sloping to steep (3 to 35 percent)

Elevation: 920 feet

Taxonomic class: Loamy-skeletal, mixed, superactive, mesic Lithic Hapludolls

Typical Pedon

Moko gravelly silt loam, in an area of Sonsac-Moko complex, 15 to 35 percent slopes, rocky, in a forest; 2,450 feet south and 290 feet west of the northeast corner of sec. 23, T. 32 N., R. 26 W.; USGS Greenfield topographic quadrangle; UTM coordinates 4,150,050 meters N. and 433,660 meters E.

A1—0 to 6 inches; very dark grayish brown (10YR 3/2) gravelly silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; many

fine and medium roots; 30 percent chert gravel; neutral; clear smooth boundary.

A2—6 to 14 inches; dark brown (10YR 3/3) very gravelly silty clay loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common fine and medium roots; 40 percent chert gravel; neutral; abrupt wavy boundary.

R—14 to 80 inches; limestone.

Range in Characteristics

Thickness of the mollic epipedon: 4 to 20 inches

A horizon:

Color—hue of 10YR, value of 2 or 3, and chroma of 1 to 3

Texture of the fine-earth fraction—silt loam, clay loam, silty clay loam, silty clay, or clay

Content of rock fragments—15 to 60 percent

Reaction—moderately acid to slightly alkaline (pH 5.6 to 7.8)

Parsons Series

Depth to bedrock: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Permeability: Very slow

Landform: Divide on upland

Position on the landform: Summit

Parent material: Silty and clayey colluvium

Slope range: Nearly level (0 to 2 percent)

Elevation: 1,065 feet

Taxonomic class: Fine, mixed, active, thermic Mollic Albaqualfs

Typical Pedon

Parsons silt loam, 0 to 2 percent slopes, in cropland; 1,350 feet south and 2,500 feet west of the northeast corner of sec. 32, T. 32 N., R. 27 W.; USGS Lockwood topographic quadrangle; UTM coordinates 4,147,520 meters N. and 418,340 meters E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium platy structure; very friable; many fine and medium roots; few fine dark yellowish brown (10YR 4/4) masses of iron accumulation; slightly acid; abrupt smooth boundary.

E—8 to 16 inches; grayish brown (10YR 5/2) silt loam; weak very fine platy structure; very friable; many fine roots; few fine dark yellowish brown (10YR 4/6) masses of iron-manganese accumulation; strongly acid; clear smooth boundary.

Btg1—16 to 24 inches; dark gray (10YR 4/1) clay; moderate medium subangular blocky structure; firm; many fine roots; few faint clay films on faces

of peds; common medium dark red (2.5YR 3/6) masses of iron accumulation; strongly acid; clear smooth boundary.

Btg2—24 to 31 inches; dark gray (10YR 4/1) and grayish brown (10YR 5/2) silty clay; moderate fine subangular blocky structure; firm; few fine roots; few faint clay films on faces of peds; common fine yellowish brown (10YR 5/6) masses of iron-manganese accumulation; very strongly acid; clear smooth boundary.

Btg3—31 to 60 inches; grayish brown (10YR 5/2) silty clay loam; strong very fine subangular blocky structure; firm; few fine roots; few faint clay films on faces of peds; common fine strong brown (7.5YR 4/6) masses of iron-manganese accumulation; strongly acid.

Range in Characteristics

Thickness of the ochric epipedon: 8 to 16 inches

Depth to the argillic horizon: 12 to 18 inches

Depth to the abrupt texture change horizon: 12 to 18 inches

Depth to the albic horizon: 4 to 12 inches

Ap horizon:

Color—hue of 10YR, value of 3, and chroma of 2
Redoximorphic features—masses of iron accumulation

Texture of the fine-earth fraction—silt loam

Content of rock fragments—none

Reaction—strongly acid to slightly acid (pH 5.1 to 6.5)

E horizon:

Color—hue of 10YR, value of 4 or 5, and chroma of 2

Redoximorphic features—masses of iron-manganese accumulation

Texture of the fine-earth fraction—silt loam

Content of rock fragments—none

Reaction—strongly acid to slightly acid (pH 5.1 to 6.5)

Btg horizon:

Color—hue of 10YR, value of 4 or 5, and chroma of 1 or 2

Redoximorphic features—masses of iron accumulation or masses of iron-manganese accumulation

Texture of the fine-earth fraction—silty clay loam, silty clay, or clay

Content of rock fragments—none

Reaction—strongly acid to slightly acid (pH 5.1 to 6.5)

Pomme Series

Depth to bedrock: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Strath terrace on river valley

Position on the landform: Summit

Parent material: Loess over gravelly colluvium over clayey residuum weathered from cherty limestone

Slope range: Very gently sloping to moderately sloping (1 to 8 percent)

Elevation: 1,090 feet

Taxonomic class: Fine-loamy, mixed, semiactive, mesic Typic Paleudalfs

Typical Pedon

Pomme silt loam, 1 to 3 percent slopes, in a pasture; 200 feet east and 1,500 feet south of the northwest corner of sec. 35, T. 31 N., R. 27 W.; USGS Lockwood topographic quadrangle; UTM coordinates 4,137,740 meters N. and 422,180 meters E.

Ap—0 to 8 inches; brown (10YR 4/3) silt loam; weak medium granular structure; very friable; common fine and medium roots; slightly acid; abrupt smooth boundary.

Bt1—8 to 15 inches; brown (7.5YR 4/4) silt loam; moderate medium subangular blocky structure parting to weak fine granular; friable; common fine and medium roots; few faint clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—15 to 26 inches; brown (7.5YR 4/4) silt loam; moderate medium subangular blocky structure; friable; few fine and medium roots; few faint clay films on faces of peds; common fine iron-manganese concretions; 5 percent chert gravel; slightly acid; clear wavy boundary.

2Bt3—26 to 32 inches; yellowish red (5YR 4/6) gravelly loam; moderate medium subangular blocky structure; firm; common distinct clay films on faces of peds; common fine iron-manganese concretions; 15 percent chert gravel; slightly acid; clear wavy boundary.

2Bt4—32 to 44 inches; yellowish red (5YR 4/6) and dark red (2.5YR 3/6) very gravelly loam; moderate medium subangular blocky structure; firm; many prominent clay films on faces of peds; 30 percent chert gravel and 15 percent cobbles; moderately acid; clear smooth boundary.

3Bt5—44 to 53 inches; dark red (2.5YR 3/6) gravelly clay; strong medium angular blocky structure; firm; common distinct clay films on faces of peds; 20 percent chert gravel; strongly acid; gradual smooth boundary.

3Bt6—53 to 72 inches; red (2.5YR 4/8) and brownish

yellow (10YR 6/6) gravelly clay; common fine and medium distinct strong brown (7.5YR 5/8) mottles; strong medium angular blocky structure; firm; common distinct clay films on faces of peds; common fine and medium strong brown (7.5YR 5/8) masses of iron accumulation; 20 percent chert gravel; strongly acid.

Range in Characteristics

Thickness of the ochric epipedon: 5 to 12 inches

Depth to the argillic horizon: 5 to 12 inches

Depth to the 2Bt horizon: 11 to 50 inches

Ap horizon:

Color—hue of 10YR, value of 3 or 4, and chroma of 3 or 4

Redoximorphic features—none

Texture of the fine-earth fraction—silt loam

Content of rock fragments—0 to 5 percent

Reaction—moderately acid to neutral (pH 5.6 to 7.3)

A horizon (where present):

Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 3 or 4

Redoximorphic features—none

Texture of the fine-earth fraction—silt loam

Content of rock fragments—0 to 10 percent

Reaction—moderately acid to neutral (pH 5.6 to 7.3)

BA horizon (where present):

Color—hue of 5YR to 10YR, value of 3 to 5, and chroma of 3, 4, or 6

Redoximorphic features—none

Texture of the fine-earth fraction—silt loam

Content of rock fragments—0 to 4 percent

Reaction—slightly acid (pH 6.1 to 6.5)

Bt horizon:

Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3, 4, 6, or 8

Redoximorphic features—none

Texture of the fine-earth fraction—silt loam, silty clay loam, or clay loam

Content of rock fragments—0 to 30 percent

Reaction—moderately acid to neutral (pH 5.6 to 7.3)

2Bt horizon:

Color—hue of 2.5YR to 10YR, value of 3 to 6, and chroma of 4, 6, or 8

Redoximorphic features—masses of iron accumulation

Texture of the fine-earth fraction—loam, silt loam, clay loam, or silty clay loam

Content of rock fragments—15 to 50 percent
Reaction—strongly acid to neutral (pH 5.1 to 7.3)

3Bt horizon:

Color—hue of 2.5YR or 7.5YR, value of 3 to 5, and chroma of 6 or 8
Redoximorphic features—none
Texture of the fine-earth fraction—clay
Content of rock fragments—20 to 75 percent
Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

Secesh Series

Depth to bedrock: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Flood-plain step on river valley

Parent material: Loamy alluvium over gravelly residuum weathered from cherty limestone

Slope range: Nearly level (0 to 2 percent)

Elevation: 1,000 feet

Taxonomic class: Fine-loamy, siliceous, active, mesic Ultic Hapludalfs

Typical Pedon

Secesh silt loam, 0 to 2 percent slopes, occasionally flooded, in a pasture; 1,600 feet north and 650 feet east of the southwest corner of sec. 36, T. 30 N., R. 26 W.; USGS South Greenfield topographic quadrangle; UTM coordinates 4,126,940 meters N. and 433,460 meters E.

Ap—0 to 8 inches; brown (7.5YR 4/4) silt loam, brown (10YR 5/3) dry; weak medium platy structure parting to weak medium granular; friable; many fine roots; 5 percent chert gravel; slightly acid; clear smooth boundary.

BA—8 to 14 inches; brown (7.5YR 4/4) silt loam; weak fine subangular blocky structure; friable; many fine roots; 10 percent chert gravel; slightly acid; clear smooth boundary.

Bt1—14 to 24 inches; brown (7.5YR 4/4) loam; moderate fine subangular blocky structure; firm; common fine roots; common distinct clay films on faces of peds; 10 percent chert gravel; moderately acid; clear smooth boundary.

2Bt2—24 to 34 inches; strong brown (7.5YR 4/6) very gravelly clay loam; weak fine subangular blocky structure; firm; few fine roots; common distinct clay films on faces of peds; few masses of iron-manganese accumulation; 35 percent chert gravel and 10 percent chert cobbles; moderately acid; clear wavy boundary.

2Bt3—34 to 46 inches; brown (7.5YR 4/4) gravelly clay

loam; strong fine and medium subangular blocky structure; firm; few fine roots; common distinct clay films on faces of peds; few masses of iron-manganese accumulation; 15 percent chert gravel; moderately acid; clear smooth boundary.

2Bt4—46 to 60 inches; brown (7.5YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; firm; few fine roots; common distinct clay films on faces of peds; few masses of iron-manganese accumulation; 5 percent chert gravel; moderately acid.

Range in Characteristics

Thickness of the ochric epipedon: 6 to 14 inches

Depth to the argillic horizon: 6 to 14 inches

Ap or A horizon:

Color—hue of 7.5YR, value of 3 or 4, and chroma of 2 to 4

Texture of the fine-earth fraction—silt loam

Content of rock fragments—0 to 5 percent

Reaction—moderately acid or slightly acid (pH 5.6 to 6.5)

BA horizon:

Color—hue of 7.5YR, value of 4, and chroma of 4

Texture of the fine-earth fraction—silt loam or silty clay loam

Content of rock fragments—10 percent

Reaction—strongly acid to slightly acid (pH 5.1 to 6.5)

Bt horizon:

Color—hue of 7.5YR, value of 4 to 5, and chroma of 4 or 6

Texture of the fine-earth fraction—silty clay loam, loam, or silt loam

Content of rock fragments—0 to 20 percent

Reaction—strongly acid or moderately acid (pH 5.1 to 6.0)

2Bt horizon:

Color—hue of 7.5YR, value of 4, and chroma of 4 or 6

Texture of the fine-earth fraction—clay loam or silty clay loam

Content of rock fragments—5 to 45 percent

Reaction—strongly acid or moderately acid (pH 5.1 to 6.0)

Sonsac Series

Depth to bedrock: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Hill on upland

Position on the landform: Backslope

Parent material: Gravelly colluvium over clayey residuum

Slope range: Moderately sloping to steep (3 to 35 percent)

Elevation: 970 feet

Taxonomic class: Clayey-skeletal, mixed, active, mesic Typic Hapludalfs

Typical Pedon

Sonsac very cobbly silt loam, in an area of Sonsac-Moko-Rock outcrop complex, 3 to 15 percent slopes, in a pasture; 1,900 feet west and 2,000 feet north of the southeast corner of sec. 17. T. 32 N. R. 26 W.; USGS Crisp topographic quadrangle; UTM coordinates 4,151,600 meters N. and 428,060 meters E.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) very cobbly silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; very friable; many fine roots; moderately alkaline; 10 percent gravel, 35 percent cobbles, and 5 percent stones; abrupt smooth boundary.

BA—3 to 6 inches; strong brown (7.5YR 4/6) and very dark grayish brown (10YR 3/2) very cobbly silt loam, light brown (7.5YR 6/3) and grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; many fine roots; neutral; 15 percent gravel, 35 percent cobbles, and 5 percent stones; abrupt smooth boundary.

Bt1—6 to 9 inches; brown (10YR 4/3) very cobbly silty clay loam; weak fine subangular blocky structure; friable; common fine roots; common faint clay films on faces of peds; slightly acid; 10 percent gravel, 40 percent cobbles, and 5 percent stones; clear smooth boundary.

2Bt2—9 to 15 inches; reddish brown (5YR 4/4) extremely cobbly clay; moderate fine subangular blocky structure; firm; common fine roots; common distinct clay films on faces of peds; slightly acid; 15 percent gravel, 45 percent cobbles, and 5 percent stones; clear wavy boundary.

2Bt3—15 to 21 inches; dark red (2.5YR 3/6) very cobbly clay; moderate fine angular blocky structure; firm; few fine roots; many distinct clay films on faces of peds; few fine masses of iron-manganese accumulation; slightly acid; 5 percent gravel, 45 percent cobbles, and 5 percent stones; gradual wavy boundary.

2Bt4—21 to 31 inches; yellowish red (5YR 4/6) very cobbly clay; moderate fine and medium angular blocky structure; firm; few very fine roots; common distinct clay films on faces of peds; few fine masses of iron-manganese accumulation; neutral;

10 percent gravel, 30 percent cobbles, and 5 percent stones; clear wavy boundary.
2R—31 to 80 inches; limestone.

Range in Characteristics

Thickness of the ochric epipedon: 5 to 13 inches

Depth to the argillic horizon: 5 to 13 inches

Depth to the 2Bt horizon: 8 to 22 inches

Depth to the lithic contact: 20 to 40 inches

A horizon:

Color—hue of 10YR, value of 3 or 4, and chroma of 2 or 3

Texture of the fine-earth fraction—silt loam

Content of rock fragments—15 to 55 percent

Reaction—strongly acid to slightly acid (pH 5.1 to 6.5)

BA horizon:

Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2, 3, 4, or 6

Texture of the fine-earth fraction—silt loam

Content of rock fragments—35 to 70 percent

Reaction—strongly acid to slightly acid (pH 5.1 to 6.5)

BE horizon (where present):

Color—hue of 10YR, value of 6, and chroma of 6

Texture of the fine-earth fraction—silt loam

Content of rock fragments—40 percent

Reaction—moderately acid (pH 5.6 to 6.0)

Bt horizon:

Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 3, 4, or 6

Texture of the fine-earth fraction—silt loam or silty clay loam

Content of rock fragments—40 to 65 percent

Reaction—strongly acid to neutral (pH 5.1 to 7.3)

2Bt horizon:

Color—hue of 2.5YR to 7.5YR, value of 3 or 4, and chroma of 4 or 6

Texture of the fine-earth fraction—silty clay or clay

Content of rock fragments—20 to 55 percent

Reaction—strongly acid to neutral (pH 5.1 to 7.3)

Sturkie Series

Depth to bedrock: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Flood plain on river valley

Parent material: Silty alluvium

Slope range: Nearly level (0 to 2 percent)

Elevation: 905 feet

Taxonomic class: Fine-silty, mixed, superactive, mesic
Cumulic Hapludolls

Typical Pedon

Sturkie silt loam, 0 to 2 percent slopes, frequently flooded, in a pasture; 2,200 feet south and 1,100 feet east of the northwest corner of sec. 32, T. 31 N., R. 26 W.; USGS Greenfield topographic quadrangle; UTM coordinates 4,137,360 meters N. and 427,370 meters E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; many very fine roots; slightly acid; abrupt smooth boundary.

Bw1—8 to 24 inches; black (10YR 2/1) silty clay loam, dark grayish brown (10YR 4/2) dry; weak medium prismatic structure parting to moderate very fine subangular blocky; friable; many very fine roots; neutral; gradual smooth boundary.

Bw2—24 to 34 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; weak very fine subangular blocky structure; friable; many very fine roots; slightly acid; gradual smooth boundary.

Bw3—34 to 53 inches; dark brown (10YR 3/3) silty clay loam, brown (10YR 5/3) dry; weak very fine subangular blocky structure; friable; common very fine roots; few distinct organic coats in root channels and/or pores; slightly acid; gradual smooth boundary.

C—53 to 72 inches; brown (10YR 4/3) silty clay loam; massive; friable; few distinct organic coats in root channels and/or pores; slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 25 to 53 inches

Depth to the cambic horizon: 31 to 52 inches

Ap or A horizon:

Color—hue of 10YR, value of 3, and chroma of 2 or 3

Texture of the fine-earth fraction—silt loam

Content of rock fragments—none

Reaction—moderately acid to neutral (pH 5.6 to 7.8)

Bw horizon:

Color—hue of 10YR, value of 2 to 5, and chroma of 1 to 4

Texture of the fine-earth fraction—silt loam or silty clay loam

Content of rock fragments—none

Reaction—moderately acid to neutral (pH 6.1 to 7.3)

C horizon:

Color—hue of 10YR, value of 4, and chroma of 3

Texture of the fine-earth fraction—silty clay loam or silt loam

Content of rock fragments—none

Reaction—slightly acid or neutral (pH 6.1 to 7.3)

Sylvania Series

Depth to bedrock: Deep (40 to 60 inches)

Drainage class: Moderately well drained

Permeability: Moderately slow

Landform: Hill and ridge on upland

Position on the landform: Backslope and summit

Parent material: Colluvium over clayey residuum weathered from sandstone and shale

Slope range: Gently sloping to strongly sloping (2 to 15 percent)

Elevation: 1,035 feet

Taxonomic class: Fine, mixed, active, thermic Oxaquic Haplohumults

Typical Pedon

Sylvania loam, 5 to 15 percent slopes, very stony, in a pasture; 1,900 feet west and 2,900 feet north of the southeast corner of sec. 18, T. 32 N., R. 28 W.; USGS Cedarville topographic quadrangle; UTM coordinates 4,152,160 meters N. and 417,070 meters E.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) loam, brown (10YR 5/3) dry; weak fine granular structure; friable; common medium roots; 10 percent sandstone gravel and 3 percent sandstone cobbles; very strongly acid; abrupt smooth boundary.

A—6 to 11 inches; dark brown (10YR 3/3) gravelly loam, brown (10YR 5/3) dry; weak fine granular structure; friable; common medium roots; 15 percent sandstone gravel and 5 percent sandstone cobbles; very strongly acid; clear smooth boundary.

BA—11 to 15 inches; brown (7.5YR 4/4) very gravelly sandy clay loam; weak fine subangular blocky structure parting to weak fine granular; friable; common fine roots; 45 percent sandstone gravel and 5 percent sandstone cobbles; strongly acid; abrupt wavy boundary.

2Bt1—15 to 24 inches; red (2.5YR 4/6) and dark reddish brown (2.5YR 3/4) clay; weak fine subangular blocky structure; firm; common very fine roots; common distinct continuous clay films on faces of peds; few fine weak red (10R 4/4) and common fine yellowish brown (10YR 5/6) masses

of iron accumulation; 5 percent sandstone channers; very strongly acid; gradual smooth boundary.

2Bt2—24 to 30 inches; brownish yellow (10YR 6/6) clay; moderate fine subangular blocky structure; firm; common very fine roots; common distinct continuous clay films on faces of peds; common fine red (10R 4/6) masses of iron accumulation; very strongly acid; gradual smooth boundary.

2Bt3—30 to 40 inches; light yellowish brown (10YR 6/4) clay; weak fine subangular blocky structure; firm; common very fine roots; common distinct continuous clay films on faces of peds; many fine dark red (2.5YR 3/6) and common fine strong brown (7.5YR 5/6) masses of iron accumulation; very strongly acid; gradual smooth boundary.

2Bt4—40 to 45 inches; light brownish gray (10YR 6/2) silty clay; weak thin platy structure parting to weak very fine and fine subangular blocky; firm; common distinct continuous clay films on faces of peds; common fine brownish yellow (10YR 6/8) and common fine red (2.5YR 4/8) masses of iron accumulation; very strongly acid; clear smooth boundary.

2Cr—45 to 55 inches; shale.

Range in Characteristics

Thickness of the umbric epipedon: 10 to 19 inches

Depth to the argillic horizon: 11 to 19 inches

Depth to the 2Bt horizon: 15 to 19 inches

Depth to the paralithic contact: 42 to 51 inches

Ap horizon:

Color—hue of 10YR, value of 3, and chroma of 2

Redoximorphic features—none

Texture of the fine-earth fraction—loam

Content of rock fragments—10 to 13 percent

Reaction—very strongly acid or strongly acid (pH 4.5 to 5.5)

A horizon:

Color—hue of 10YR, value of 2 to 3, and chroma of 1 to 3

Redoximorphic features—none

Texture of the fine-earth fraction—loam

Content of rock fragments—0 to 20 percent

Reaction—very strongly acid or strongly acid (pH 4.5 to 5.5)

BA horizon:

Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2, 3, 4, or 6

Redoximorphic features—none

Texture of the fine-earth fraction—loam, sandy clay loam, or clay loam

Content of rock fragments—5 to 50 percent

Reaction—very strongly acid or strongly acid (pH 4.5 to 5.5)

Bt horizon (where present):

Color—hue of 5YR or 10YR, value of 4 or 5, and chroma of 3, 4, or 6

Redoximorphic features—iron depletions, masses of iron accumulation, or masses of iron-manganese accumulation

Texture of the fine-earth fraction—clay loam or clay

Content of rock fragments—0 to 10 percent

Reaction—very strongly acid or strongly acid (pH 4.5 to 5.5)

2Bt horizon:

Color—hue of 2.5YR, 7.5YR, or 10YR, value of 3 to 6, and chroma of 2, 3, 4, or 6

Redoximorphic features—iron concretions or masses of iron accumulation

Texture of the fine-earth fraction—loam, clay loam, silty clay, or clay

Content of rock fragments—0 to 45 percent

Reaction—very strongly acid or strongly acid (pH 4.5 to 5.5)

2BC horizon (where present):

Color—hue of 10YR, value of 5, and chroma of 3 or 6

Redoximorphic features—iron depletions or masses of iron accumulation

Texture of the fine-earth fraction—loam

Content of rock fragments—5 to 35 percent

Reaction—very strongly acid or strongly acid (pH 4.5 to 5.5)

Verdigris Series

Depth to bedrock: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Flood plain on river valley

Parent material: Silty alluvium

Slope range: Level (0 to 1 percent)

Elevation: 990 feet

Taxonomic class: Fine-silty, mixed, superactive, thermic Cumulic Hapludolls

Typical Pedon

Verdigris silt loam, 0 to 1 percent slope, frequently flooded, in cropland; 2,200 feet west and 20 feet south of the northeast corner of sec. 8, T. 31 N., R. 28 W.; USGS Golden City topographic quadrangle; UTM coordinates 4,145,020 meters N. and 408,810 meters E.

- Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; common very fine roots; neutral; abrupt smooth boundary.
- A—7 to 20 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak very fine subangular blocky structure parting to moderate fine granular; friable; common very fine roots; neutral; gradual smooth boundary.
- Bw1—20 to 30 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak fine subangular blocky structure; friable; common very fine roots; common distinct very dark grayish brown (10YR 3/2) organic coats; slightly acid; clear smooth boundary.
- Bw2—30 to 42 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure; friable; common very fine roots; many distinct very dark grayish brown (10YR 3/2) organic coats; moderately acid; gradual smooth boundary.
- Bw3—42 to 60 inches; brown (10YR 4/3) silt loam; weak fine subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) organic coats and few distinct gray (10YR 5/1) silt coats; moderately acid.

Range in Characteristics

Ap horizon:

Color—hue of 10YR, value of 3, and chroma of 2
 Texture of the fine-earth fraction—silt loam
 Content of rock fragments—none
 Reaction—moderately acid to neutral (pH 5.6 to 7.3)

A horizon:

Color—hue of 10YR, value of 3, and chroma of 2
 Texture of the fine-earth fraction—silt loam
 Content of rock fragments—none
 Reaction—moderately acid to neutral (pH 5.6 to 7.3)

Bw horizon:

Color—hue of 10YR, value of 3 or 4, and chroma of 2 or 3
 Texture of the fine-earth fraction—silt loam or silty clay loam
 Content of rock fragments—none
 Reaction—moderately acid to neutral (pH 5.6 to 7.3)

Viraton Series

Depth to bedrock: Very deep (more than 60 inches)

Drainage class: Moderately well drained

Permeability: Moderate above the fragipan; very slow in the fragipan

Landform: Ridge on upland

Position on the landform: Summit

Parent material: Fine-loamy colluvium over gravelly colluvium over residuum

Slope range: Gently sloping (2 to 5 percent)

Elevation: 1,175 feet

Taxonomic class: Fine-loamy, siliceous, active, mesic Oxyaquic Fragiudalfs

Typical Pedon

Viraton silt loam, 2 to 5 percent slopes, in a pasture; 2,300 feet north and 300 feet east of the southwest corner of sec. 31, T. 30 N., R. 26 W.; USGS South Greenfield topographic quadrangle; UTM coordinates 4,127,470 meters N. and 425,180 meters E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; strong fine granular structure; very friable; many fine roots; slightly acid; clear smooth boundary.

BE—6 to 11 inches; yellowish brown (10YR 5/4) silt loam; moderate fine subangular blocky structure; very friable; common fine roots; neutral; gradual wavy boundary.

Bt1—11 to 21 inches; dark yellowish brown (10YR 4/4) gravelly silty clay loam; moderate fine subangular blocky structure; friable; common fine roots; few distinct clay films on faces of peds; 15 percent chert gravel; strongly acid; abrupt wavy boundary.

2Btx—21 to 30 inches; grayish brown (10YR 5/2) and strong brown (7.5YR 5/6) very gravelly silty clay loam; strong very coarse prismatic structure parting to weak thin platy; very firm, brittle; many very fine and fine roots in mat at top of horizon and few fine roots in cracks; few distinct clay films on faces of peds; common fine dark red (2.5YR 3/6) masses of iron accumulation; 30 percent chert gravel and 10 percent chert cobbles; strongly acid; abrupt wavy boundary.

3Bt1—30 to 39 inches; dark red (2.5YR 3/6) gravelly clay; strong fine angular blocky structure; firm; common distinct clay films on faces of peds; common fine brown (7.5YR 5/3) and reddish yellow (7.5YR 6/6) masses of iron accumulation; 15 percent chert gravel; moderately acid; gradual wavy boundary.

3Bt2—39 to 60 inches; dark red (2.5YR 3/6) gravelly clay; strong fine angular blocky structure; firm; common distinct clay films on faces of peds; common fine brown (7.5YR 5/4) and strong brown (7.5YR 5/6) masses of iron accumulation; 15 percent chert gravel; moderately acid.

Range in Characteristics

Thickness of the ochric epipedon: 6 to 12 inches

Depth to the argillic horizon: 6 to 12 inches

Depth to the fragipan horizon: 18 to 33 inches

Ap horizon:

Color—hue of 10YR, value of 3 to 5, and chroma of 3

Redoximorphic features—none

Texture of the fine-earth fraction—silt loam

Content of rock fragments—0 to 5 percent

Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

BE horizon:

Color—hue of 10YR, value of 5, and chroma of 4

Redoximorphic features—none

Texture of the fine-earth fraction—silt loam

Content of rock fragments—none

Reaction—neutral (pH 6.6 to 7.3)

Bt horizon:

Color—hue of 5YR to 10YR, value of 4 or 5, and chroma of 4 or 6

Redoximorphic features—none

Texture of the fine-earth fraction—silty clay loam or silt loam

Content of rock fragments—0 to 25 percent

Reaction—very strongly acid to moderately acid (pH 4.5 to 6.0)

2Btx horizon:

Color—hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 or 6

Redoximorphic features—masses of iron accumulation

Texture of the fine-earth fraction—silty clay loam or silt loam

Content of rock fragments—40 to 55 percent

Reaction—extremely acid to strongly acid (pH 3.5 to 5.5)

3Bt horizon:

Color—hue of 2.5YR to 7.5YR, value of 3 or 5, and chroma of 6

Redoximorphic features—masses of iron accumulation

Texture of the fine-earth fraction—clay or silty clay

Content of rock fragments—15 to 70 percent

Reaction—very strongly acid to neutral (pH 4.5 to 7.3)

Wanda Series

Depth to bedrock: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Paleoterrace on river valley

Position on the landform: Foothlope

Parent material: Loess over gravelly colluvium

Slope range: Gently sloping (2 to 5 percent)

Elevation: 1,080 feet

Taxonomic class: Fine-loamy, mixed, active, mesic Typic Paleudolls

Typical Pedon

Wanda silt loam, 2 to 5 percent slopes, in cropland; 200 feet west and 1,100 feet south of the northeast corner of sec. 20, T. 30 N., R. 26 W.; USGS South Greenfield topographic quadrangle; UTM coordinates 4,131,200 meters N. and 428,390 meters E.

Ap—0 to 9 inches; very dark brown (10YR 2/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; common very fine and fine roots; 4 percent chert gravel; moderately acid; clear smooth boundary.

A—9 to 15 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate very fine subangular blocky structure; friable; few very fine roots; slightly acid; clear smooth boundary.

Bt1—15 to 21 inches; brown (7.5YR 4/4) silty clay loam; weak very fine and fine subangular blocky structure; firm; few very fine roots; many distinct clay films on faces of peds and common organic coats in root channels and/or pores; common fine iron-manganese concretions; 5 percent chert gravel; slightly acid; clear smooth boundary.

Bt2—21 to 26 inches; dark reddish brown (5YR 3/4) and brown (7.5YR 4/4) silty clay loam; moderate fine subangular blocky structure; firm; few very fine roots; many distinct clay films on faces of peds and common organic coats in root channels and/or pores; common fine iron-manganese concretions; 5 percent chert gravel; slightly acid; clear smooth boundary.

2Bt3—26 to 33 inches; dark reddish brown (2.5YR 3/4) silty clay loam; moderate fine subangular blocky structure; firm; few very fine roots; many distinct clay films on faces of peds; common fine iron-manganese concretions; 10 percent chert gravel; slightly acid; abrupt smooth boundary.

2Bt4—33 to 44 inches; dark reddish brown (2.5YR 3/4) and red (2.5YR 4/6) silty clay loam; moderate fine subangular blocky structure; firm; many distinct clay films on faces of peds; common fine iron-manganese concretions; 10 percent chert gravel; moderately acid; gradual smooth boundary.

2Bt5—44 to 60 inches; dark red (2.5YR 3/6) and brown (7.5YR 4/4) gravelly silty clay loam; moderate medium subangular blocky structure; firm; many

distinct clay films on faces of peds; few fine iron-manganese concretions; 15 percent chert gravel; moderately acid; clear wavy boundary.

Range in Characteristics

Thickness of the mollic epipedon: 11 to 16 inches

Depth to the argillic horizon: 11 to 16 inches

Depth to the 2Bt horizon: 22 to 61 inches

Ap horizon:

Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 2

Texture of the fine-earth fraction—silt loam

Content of rock fragments—0 to 12 percent

Reaction—moderately acid to neutral (pH 5.6 to 7.3)

A horizon:

Color—hue of 10YR, value of 3, and chroma of 2 or 3

Texture of the fine-earth fraction—silt loam

Content of rock fragments—0 to 5 percent

Reaction—moderately acid to neutral (pH 5.6 to 7.3)

AB horizon (where present):

Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4

Texture of the fine-earth fraction—silt loam or silty clay loam

Content of rock fragments—0 to 15 percent

Reaction—neutral (pH 6.6 to 7.3)

Bt horizon:

Color—hue of 2.5YR to 10YR, value of 3 to 4, and chroma of 2, 3, 4, or 6

Texture of the fine-earth fraction—silty clay loam

Content of rock fragments—0 to 20 percent

Reaction—strongly acid to slightly acid (pH 5.1 to 6.5)

2Bt horizon:

Color—hue of 10R to 7.5YR, value of 3 to 4, and chroma of 4 or 6

Texture of the fine-earth fraction—silty clay loam or silty clay

Content of rock fragments—15 to 55 percent

Reaction—strongly acid to slightly acid (pH 5.1 to 6.5)

Wilderness Series

Depth to bedrock: Very deep (more than 60 inches)

Drainage class: Moderately well drained

Permeability: Moderate above the fragipan; slow in the fragipan

Landform: Ridge on upland

Position on the landform: Shoulder

Parent material: Gravelly colluvium over clayey residuum weathered from cherty limestone

Slope range: Moderately sloping (3 to 8 percent)

Elevation: 1,055 feet

Taxonomic class: Loamy-skeletal, siliceous, active, mesic Oxyaquic Fragiudalfs

Typical Pedon

Wilderness gravelly silt loam, 3 to 8 percent slopes; 1,100 feet east and 1,100 feet south of the northwest corner of sec. 13, T. 33 N., R. 24 W.; USGS Aldrich topographic quadrangle; UTM coordinates 4,160,350 meters N. and 454,200 meters E.

Ap—0 to 6 inches; brown (10YR 4/3) gravelly silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; many fine roots; 15 percent chert gravel and 2 percent chert cobbles; moderately acid; clear smooth boundary.

E—6 to 11 inches; yellowish brown (10YR 5/4) gravelly silt loam; moderate medium granular structure; friable; many fine roots; 20 percent chert gravel and 2 percent chert cobbles; slightly acid; gradual smooth boundary.

Bt1—11 to 16 inches; brown (7.5YR 4/4) very gravelly silt loam; weak fine subangular blocky structure; firm; common fine roots; common distinct clay films on faces of peds; 45 percent chert gravel and 5 percent chert cobbles; slightly acid; clear wavy boundary.

Bt2—16 to 25 inches; strong brown (7.5YR 4/6) extremely gravelly silty clay loam; moderate fine subangular blocky and medium subangular blocky structure; firm; few fine roots; common distinct clay films and common distinct silt coats on faces of peds; common fine brown (10YR 5/3) iron depletions; 70 percent chert gravel and 5 percent chert cobbles; strongly acid; abrupt wavy boundary.

Btx—25 to 32 inches; yellowish red (5YR 4/6), strong brown (7.5YR 5/6), and dark grayish brown (10YR 4/2) very gravelly silt loam; weak very coarse prismatic structure parting to weak coarse subangular blocky; very firm, brittle; few fine roots; few distinct clay films on faces of peds; 45 percent chert gravel and 10 percent chert cobbles; strongly acid; clear wavy boundary.

2Bt1—32 to 48 inches; red (2.5YR 4/6) and reddish yellow (7.5YR 6/8) gravelly clay; moderate medium subangular blocky structure; very firm; few very fine roots; common distinct clay films on faces of peds; 20 percent chert gravel and 5 percent chert cobbles; very strongly acid; gradual smooth boundary.

2Bt2—48 to 60 inches; red (2.5YR 4/6) gravelly clay; moderate coarse subangular blocky structure; very firm; common distinct clay films on faces of pedis; many fine brownish yellow (10YR 6/8) masses of iron accumulation; 30 percent chert gravel; moderately acid.

Range in Characteristics

Thickness of the ochric epipedon: 3 to 20 inches

Depth to the argillic horizon: 3 to 20 inches

Depth to the 2Bt horizon: 24 to 52 inches

Depth to the fragipan horizon: 15 to 29 inches

Ap or A horizon:

Color—hue of 10YR, value of 2 to 4, and chroma of 2 or 3

Redoximorphic features—none

Texture of the fine-earth fraction—silt loam

Content of rock fragments—15 to 40 percent

Reaction—very strongly acid to slightly acid (pH 4.5 to 6.5)

E horizon:

Color—hue of 10YR, value of 4 or 6, and chroma of 3 or 4

Redoximorphic features—none

Texture of the fine-earth fraction—silt loam

Content of rock fragments—15 to 30 percent

Reaction—very strongly acid to slightly acid (pH 4.5 to 6.5)

Bt horizon:

Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3, 4, or 6

Redoximorphic features—none

Texture of the fine-earth fraction—silt loam or silty clay loam

Content of rock fragments—40 to 75 percent

Reaction—very strongly acid to slightly acid (pH 4.5 to 6.5)

Btx horizon:

Color—hue of 2.5YR to 10YR, value of 3 to 6, and chroma of 2 or 6

Redoximorphic features—iron depletions

Texture of the fine-earth fraction—loam or silt loam

Content of rock fragments—50 to 70 percent

Reaction—extremely acid to strongly acid (pH 3.5 to 5.5)

2Bt horizon:

Color—hue of 2.5YR to 7.5YR, value of 3 to 6, and chroma of 4, 6, or 8

Redoximorphic features—iron depletions or masses of iron accumulation

Texture of the fine-earth fraction—clay or silty clay

Content of rock fragments—10 to 70 percent

Reaction—very strongly acid to moderately acid (pH 4.5 to 6.0)

Woodson Series

Depth to bedrock: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Permeability: Very slow

Landform: Paleoterrace on river valley

Position on the landform: Toeslope

Parent material: Silty and clayey colluvium

Slope range: Very gently sloping (1 to 3 percent)

Elevation: 965 feet

Taxonomic class: Fine, smectitic, thermic Abruptic Argiaquolls

Typical Pedon

Woodson silt loam, 1 to 3 percent slopes, in a pasture; 2,300 feet east and 200 feet north of the southwest corner of sec. 26, T. 32 N., R. 26 W.; USGS Greenfield topographic quadrangle; UTM coordinates 4,147,600 meters N. and 432,930 meters E.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate fine and medium subangular blocky structure; friable; many fine roots; few fine iron-manganese concretions; strongly acid; abrupt smooth boundary.

Btg1—8 to 19 inches; very dark gray (10YR 3/1) clay, grayish brown (10YR 5/2) dry; strong medium angular blocky structure; firm; many fine roots; many prominent clay films on faces of pedis; common fine dark yellowish brown (10YR 4/4) masses of iron accumulation; common fine and medium masses of calcium carbonate; neutral; clear smooth boundary.

Btg2—19 to 28 inches; gray (10YR 5/1) clay; moderate medium angular blocky structure; firm; few fine roots; many prominent clay films on faces of pedis; few fine yellowish brown (10YR 5/6) and brown (7.5YR 5/4) masses of iron accumulation; common fine and medium masses of calcium carbonate; neutral; clear smooth boundary.

Btg3—28 to 43 inches; gray (10YR 5/1) clay; moderate medium subangular blocky structure; firm; few fine roots; many prominent clay films on faces of pedis; few light olive brown (2.5Y 5/4) masses of iron accumulation; common fine iron-manganese concretions; common fine and medium masses of calcium carbonate; slightly alkaline; clear wavy boundary.

Btg4—43 to 57 inches; gray (2.5Y 5/1) clay; moderate fine and medium angular blocky structure; firm;

few very fine roots; many prominent clay films on faces of peds; many medium olive yellow (2.5Y 6/6) masses of iron accumulation; common fine iron-manganese concretions; common fine and medium masses of calcium carbonate; slightly alkaline; clear wavy boundary.

BCg—57 to 80 inches; gray (2.5Y 5/1), brownish yellow (10YR 6/8), and light olive brown (2.5Y 5/6) clay loam; moderate fine angular blocky structure parting to strong very fine angular blocky; firm; common prominent clay films on vertical and horizontal faces of peds; slightly alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 19 inches

Depth to the argillic horizon: 8 to 15 inches

Ap horizon:

Color—hue of 10YR, value of 3, and chroma of 1

Redoximorphic features—masses of iron-manganese accumulation

Texture of the fine-earth fraction—silt loam

Content of rock fragments—0 to 8 percent

Reaction—strongly acid to slightly acid (pH 5.1 to 6.5)

A horizon (where present):

Color—hue of 10YR, value of 3, and chroma of 1

Redoximorphic features—masses of iron-manganese accumulation

Texture of the fine-earth fraction—silty clay loam

Content of rock fragments—none

Reaction—slightly acid (pH 6.1 to 6.5)

Btg horizon:

Color—hue of 10YR, value of 3 to 5, and chroma of 1

Redoximorphic features—masses of iron accumulation or masses of iron-manganese accumulation

Texture of the fine-earth fraction—silty clay or clay

Content of rock fragments—none

Reaction—moderately acid to slightly alkaline (pH 5.6 to 7.8)

BCg horizon:

Color—hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1, 2, 3, 4, 6, or 8

Redoximorphic features—none

Texture of the fine-earth fraction—silty clay, clay loam, or clay

Content of rock fragments—none

Reaction—moderately acid to slightly alkaline (pH 5.6 to 7.8)

Table 22.--Classification of the Soils

Soil name	Family or higher taxonomic class
Alsup-----	Fine, mixed, active, mesic Oxyaquic Hapludalfs
Barco-----	Fine-loamy, mixed, active, thermic Humic Hapludults
Barden-----	Fine, mixed, active, thermic Aquollic Hapludalfs
Basehor-----	Loamy, siliceous, superactive, mesic Lithic Dystrudepts
Bolivar-----	Fine-loamy, mixed, active, thermic Ultic Hapludalfs
Bona-----	Clayey-skeletal, mixed, semiactive, mesic Typic Paleudolls
Cherokee-----	Fine, mixed, active, thermic Typic Albaqualfs
Cliquot-----	Fine, mixed, semiactive, mesic Oxyaquic Hapludults
Crelton-----	Fine, mixed, active, mesic Oxyaquic Fragiudalfs
Dameron-----	Fine-loamy, mixed, superactive, mesic Cumulic Hapludolls
Eldorado-----	Loamy-skeletal, mixed, active, thermic Typic Paleudolls
Gerald-----	Fine, mixed, active, mesic Aeric Fragiaqualfs
Goss-----	Clayey-skeletal, mixed, active, mesic Typic Paleudalfs
Hartville-----	Fine, mixed, active, mesic Aquic Hapludalfs
Heppler-----	Fine-silty, mixed, superactive, thermic Mollic Endoaqualfs
Hoberg-----	Fine-loamy, siliceous, active, mesic Oxyaquic Fragiudalfs
Hobson-----	Fine-loamy, siliceous, active, mesic Oxyaquic Fragiudalfs
Kanima-----	Loamy-skeletal, mixed, nonacid, thermic Alfic Udarents
Keeno-----	Loamy-skeletal, siliceous, active, mesic Oxyaquic Fragiudalfs
Moko-----	Loamy-skeletal, mixed, superactive, mesic Lithic Hapludolls
Parsons-----	Fine, mixed, active, thermic Mollic Albaqualfs
Pomme-----	Fine-loamy, mixed, semiactive, mesic Typic Paleudalfs
Secesh-----	Fine-loamy, siliceous, active, mesic Ultic Hapludalfs
Sonsac-----	Clayey-skeletal, mixed, active, mesic Typic Hapludalfs
Sturkie-----	Fine-silty, mixed, superactive, mesic Cumulic Hapludolls
Sylvania-----	Fine, mixed, active, thermic Oxyaquic Haplohumults
Verdigris-----	Fine-silty, mixed, superactive, thermic Cumulic Hapludolls
Viraton-----	Fine-loamy, siliceous, active, mesic Oxyaquic Fragiudalfs
Wanda-----	Fine-loamy, mixed, active, mesic Typic Paleudolls
Wilderness-----	Loamy-skeletal, siliceous, active, mesic Oxyaquic Fragiudalfs
Woodson-----	Fine, smectitic, thermic Abruptic Argiaquolls

Formation of the Soils

This section relates the soils in the survey area to the major factors of soil formation. It also describes the geology, physiography, and hydrology of the county.

Factors of Soil Formation

Soil is the product of soil-forming processes acting on accumulated or deposited geologic material. The characteristics of the soil are determined by the type of parent material; the plant and animal life on and in the soil; the climate under which the soil-forming factors were active; topography, or lay of the land; and the length of time these forces have been active.

The parent material affects the kind of soil profile that is formed and, in extreme cases, determines it almost entirely. Plant and animal life are the active factors of soil formation. The climate determines the amount of water available for leaching and the amount of heat for physical and chemical changes. Together, climate and plant and animal life act on the parent material and slowly change it to a natural body that has genetically related horizons. Topography often modifies these other factors. Finally, time is required for changes in the parent material to result in the formation of a soil. Generally, a long time is required for the development of distinct soil horizons.

These factors of soil formation are all so closely interrelated in their effects on the soil that few generalizations can be made about the effect of any one factor unless conditions are specified for the other four. Soil formation is complex, and many processes of soil development are still unknown.

Parent Material

Parent material is the unconsolidated mass from which soil is formed. The formation or the deposition of this material is the first step in the development of a soil profile. The characteristics of the material determine the chemical and mineralogical composition of the soil. In Dade County, three kinds of parent material, alone or in combinations of two or more, have contributed to the formation of the soils. These three kinds of parent material are residuum, or material

weathered from bedrock; loess, or wind-deposited material; and alluvium, or water-deposited material.

Loess, a silty material transported by the wind, is an extensive parent material in Dade County. The principal source is believed to have been the flood plains along the Missouri River.

Alluvium is material that was transported by water and deposited on nearly level flood plains. Because of the various origins and differing velocities of flowing water, this material varies greatly in texture and mineralogical composition. The source of the parent material on the flood plains along small tributary streams is limited to local uplands.

Living Organisms

Plants and animals living on or in the soil are active in the soil-forming process. Plants furnish organic matter to the soil and bring up plant nutrients from underlying layers to the surface layer. As plants die and decay, they contribute organic matter to the soil. Bacteria and fungi decompose the plant remains and help to incorporate the organic matter into the soil.

The kind of native vegetation is one factor that has greatly influenced soil formation in Dade County. The basic kinds of native vegetation were prairie grasses and forest vegetation. Additions of organic matter to soils that formed under prairie grasses are largely a result of the yearly decomposition of plant materials. Plant tops decompose at the surface, and the roots decompose at various depths in the soil. As a result, soils that formed under prairie grasses have a thick, dark surface layer.

Additions of organic matter to soils that formed under forest vegetation are mostly the result of leaves and twigs that decompose on the surface. These soils have a thin, dark surface layer.

Insects, worms, humans, and other animals affect soil formation. Bacteria and fungi cause rotting of organic materials, fix nitrogen, and improve tilth. Burrowing animals and insects loosen and mix various soil horizons.

In a relatively short time, human activities have greatly affected the processes of soil formation. The major alterations have resulted in vegetation, drainage

of wet areas, and accelerated erosion. Row crops have replaced native grasses and many forested areas. Nearly all of the flood plains and much of the upland areas are now farmed. These changes have increased food production but have had an adverse effect in terms of sustained productivity. Accelerated erosion continues to reduce the potential of many upland soils, and the loss of cropland to urban development is virtually irreversible.

Climate

Climate has been and still is an important factor of soil formation. Geologic erosion; plant and animal life; and, in more recent times, accelerated erosion all have varied with the climate.

High temperatures and adequate rainfall encourage rapid chemical and physical changes. This type of climate is conducive to the breakdown of minerals and the relocation of clay within the soil. The clay is moved downward into the soil profile, and this downward movement results in the formation of the subsoil. Nearly all of the upland soils in the county show evidence of this illuviation.

Topography

Topography, or relief, affects soil formation through its influence on drainage, runoff, the rate of water infiltration, and geologic erosion. Topography is characterized by the length, shape, aspect, and degree of slope. It is important in determining the pattern and distribution of soils.

The amount of water entering the soil depends on steepness of slope, permeability, and the intensity of rainfall. Because runoff is rapid in steep areas, very little water passes through the soil and soil formation is slow. Geologic erosion almost keeps pace with the soil-forming processes. In gently sloping areas, runoff is slow, erosion is minimal, and most of the water passes through the soil. Leaching, the translocation of clay, and other soil-forming processes are intensified in these areas. Soils in these areas generally show maximum profile development.

Soils on steep, south-facing slopes receive more direct sunlight and are drier than similar soils on north-facing slopes. Drier conditions influence soil formation by affecting the kind of vegetation, the susceptibility to erosion, and the cycles of freezing and thawing.

Time

The degree of profile development is dependent on the length of time that the parent material has been in

place and subject to the soil-forming processes. Older soils show the effects of leaching and clay movement and have developed distinct horizons. Young soils show little profile development.

Geology, Physiography, and Hydrology

Richard Henderson, soil scientist, Missouri Department of Natural Resources, prepared this section.

Nearly all of Dade County is situated in the Springfield Plateau section of the Ozarks Physiographic Province. The extreme western part of the county is in the transition area to the Osage Plains Physiographic Province. The landscape varies in response to the underlying bedrock formations. Resistant sandstone and/or cherty limestone usually cap the mounds and prairies in the western and southern parts of the county. The slopes below the caps are usually developed on less resistant shales.

Bedrock in the county consists of sedimentary rocks ranging from Jefferson City dolomite of Ordovician age to sandstone, shale, and conglomerates of Pennsylvanian age.

There are several geologically old and inactive faults that pass through Dade County. One of the most prominent is the Dadeville fault that trends in a southeast-northwest direction across northeast Dade County. Highway Y crosses the Dadeville fault approximately 7 miles west of Bona; the steeply dipping bedrock exposed in the roadcut is an example of fault displacement. Several small faults and folds parallel the structure. These faults are geologically old and inactive and are not considered a seismic risk.

Because of the effects of weathering, the bedrock surface is quite uneven. Depth to top of bedrock ranges from less than a foot on glades and rocky slopes to over 50 feet in areas where bedrock weathering has been severe. In Dade County, cherty dolomite, cherty limestone, sandstone, and shale play a significant part in the development of soils. On most of the uplands, in the southern and eastern parts of the county, a thick mantle of cherty residuum covers the bedrock. Physical and chemical weathering caused a slow disintegration of the bedrock until it was reduced to its least soluble components, which are chert and clay. Weathering has altered the soluble carbonate portion of the limestone and dolomite into a brown to red clay, but chert in the bedrock consists of crystalline silica, which is more resistant to weathering. The chert remains behind in the form of fragments or wavy horizontal beds sandwiched between layers of clay. Where there has not been significant movement of soil through

downslope creep or vertically through the slumping of bedrock, the sequence of clay and chert retain a relict structure of the original unweathered bedrock. The clay and chert that remains after bedrock disintegration is called bedrock residuum. Bedrock thickness varies according to the extent of erosion and weathering.

Precambrian granites and gneiss are from 1,500 feet to 1,800 feet below the surface.

From oldest to youngest, the geologic formations that crop out in Dade County are Jefferson City Dolomite, Cotter Dolomite, Compton Formation, Northview Formation, Pierson Formation, Burlington-Keokuk Formation, Warsaw Formation, Pennsylvanian age sandstone/conglomerates, and several Cherokee Group formations of Pennsylvanian age.

Jefferson City Dolomite. The Jefferson City Dolomite is 200 feet thick and consists of cherty gray to brown silty dolomite with some sandstone beds. The Jefferson City-Cotter Dolomite is exposed only along the Sac River near the Polk County line.

Cotter Dolomite. The Cotter Dolomite is 100 feet to 150 feet thick and is composed of silty gray to brown dolomite with some locally persistent sandstone beds. The Cotter Dolomite is exposed only along the Sac River near the Polk County line.

Compton Formation. The Compton Formation, which consists of bedded light to bluish gray limestone, is 2 feet to 20 feet thick. It has fragments of small fossils and outcrops at the base of the Northview Formation along the edges of Stockton Lake.

Northview Formation. The Northview Formation generally is 10 feet to 80 feet thick. It consists of green silty shale. The upper part of this formation has several thick beds of greenish tan siltstone. The siltstone can be identified by numerous worm-like holes and caudagalli (rooster tails) cast on the stone surface. The shale can be easily identified by its greenish color and sticky clay texture. Permeability is very slow and retards the downward percolation of ground water. The water moves laterally along the top of the shale and commonly resurfaces as a spring on a valley slope or in a gully that intersects the shale. The Northview Formation can be found exposed on hillsides near Stockton Lake.

Pierson Formation. The Pierson Formation is identifiable in Dade County as a light brown to tan dolomitic limestone. Gray to white calcite crystals are often present. The formation varies from about 35 feet thick near the Greene County line to only 10 feet to 20 feet thick in the northern part of Dade County. In most areas, the Pierson Formation is nearly indistinguishable from the Burlington-Keokuk Formation.

Elsey Formation. The Elsey Formation, if present, ranges from less than 10 feet to about 20 feet thick. It

consists of thin, alternating layers of gray limestone and chert. The chert generally occurs as nodules or thin, wavy layers between the thin layers of limestone and locally makes up 30 to 50 percent of the formation.

Burlington-Keokuk Formation. The Burlington and Keokuk Formations are recognized as separate formations. Because of their geological similarities in southwest Missouri, however, the two formations have been combined as a single unit. The Burlington-Keokuk Formation consists of light gray, coarse crystalline limestone that generally ranges from less than 10 feet to up to 200 feet thick. The formation is thin to massive, bedded limestone that has discontinuous bands of chert and is oolitic chert nodules. In the eastern part of the county, there are a number of sinkholes in the Burlington-Keokuk Formation. Infiltration of surface water through stony residuum, cracks, and fractures in the bedrock has slowly dissolved the calcium in the limestone forming a network of underground openings. Sinkholes are formed when the ceiling of an underground opening begins to "stope" or enlarge in an upward direction. The soil and rock forming the ceiling of the underground opening continue to collapse until the roof becomes so weak that there is a complete collapse reaching the surface. Many of the glade areas on uplands in eastern Dade County are in the Burlington-Keokuk Formation.

Warsaw Formation. The Warsaw Formation consists of slightly cherty fossiliferous limestone. The limestone is usually light gray, coarse to medium crystalline; the chert is nodular and light gray. The outcrop area of the Warsaw Formation is in the middle western and southwestern parts of the county. Highway 39 usually marks the eastern outcrop edge of the formation.

Pennsylvanian age sandstone/conglomerates. The Pennsylvanian age sandstone and conglomerates are an unassigned bedrock unit that rests unconformably on Mississippian rocks primarily in the eastern part of the county. The formation ranges from less than 10 feet to 90 feet thick and consists of red to brown, fine- to coarse-grained sandstone and cobble conglomerates with sandstone matrix. Some red to black shales also occur in the unit. The formation is poorly cemented; many times gravel and sand are the only evidence of its occurrence. The unit is found cresting several of the hills and mounds to the southeast of Greenfield.

Riverton Formation. The Pennsylvanian age Riverton Formation averages 30 feet to 50 feet thick in the western Dade County outcrop area. The lower part of the formation is mostly dark gray, thickly laminated shale with thin lenticular-bedded sandstone and two

thin coal beds. The upper part of the formation is mostly gray shale and clay with up to three thin coal beds. The Riverton Formation forms the long, relatively gentle slopes of the mounds along the border with Barton County.

Warner Formation. The Pennsylvanian age Warner Formation is the cap rock for many of the western Dade County mounds. The lower part of the formation is mostly interbedded very fine-grained sandstone and claystone. The upper part of the formation is largely medium to massive bedded channel-fill sandstone. The total formation varies in thickness from 30 feet to 50 feet thick.

Rowe and Drywood Formations. The Rowe and Drywood Formations are very thin in the limited outcrop areas of the formations in Dade County. They consist of alternating layers of sandstones, siltstones, shales, coals, and underclays. Much of the past coal mining activity in northwest Dade County is associated with the Rowe coal bed. The total combined thickness of the formations is between 10 feet and 25 feet.

Bluejacket Formation. The Bluejacket Formation is found capping a few mounds in extreme western Dade County at the Barton County line. The formation consists of medium- to fine-grained, brown to red sandstones and conglomerates.

All bedrock units below the Pennsylvanian will yield water to some degree. The Burlington-Keokuk, Pierson, and Elsey Formations produce 1 gallon to 10 gallons per minute in shallow wells. The Northview Formation is silty shale that acts as an aquitard. As such, it retards the downward percolation of water. The silty shale does not produce any ground water, but numerous springs are along the top of the shale. The Compton, Cotter, and Jefferson City Formations provide small quantities of water for homes and farms but are not major sources of ground water. The quality of the water has deteriorated, however, because of contamination from the surface and poorly constructed and cased wells. The major high-yielding source of ground water in the county is the dolomites in the lower Ordovician-Cambrian Formations. Several cities obtain water from wells in these formations. Wells drilled for private water supplies are typically 150 feet to 400 feet deep and yield 10 gallons to 25 gallons per minute. Wells drilled for public water supplies are generally 500 feet to 1,000 feet deep and yield up to 500 gallons per minute.

References

- Abbott, C., and L.B. Hoff. 1971. Missouri History in Cedar County. Vedette Printing Company, Greenfield, Missouri. 80 pp.
- American Association of State Highway and Transportation Officials (AASHTO). 1986. Standard specifications for highway materials and methods of sampling and testing. 14th edition, 2 volumes.
- American Society for Testing and Materials (ASTM). 1993. Standard classification of soils for engineering purposes. ASTM Standard D 2487.
- Bicknese, Nina A. 1989. Missouri natural features inventory of Cedar and Dade Counties. Missouri Department of Conservation. 153 pp.
- Brandle, J.R., D.L. Hintz, and J.W. Sturrock, editors. 1988. Windbreak technology. Elsevier Science Publications.
- Evans, Pricilla, and Dean W. Francis English. 1975. University of Missouri at Columbia, Extension Division. Lakes country regional profile MP-366. Area description and history, pages 4-7.
- Geissman, N.F., and others. 1986. Distribution of forestland in Missouri. Transcripts of the Missouri Academy of Science. Volume 20: 5-14.
- Goodspeed Publishing Company, The. 1889. History of Hickory, Polk, Cedar, Dade, and Barton Counties, Missouri. Illustrated, Rare Book.
- Historical Society of Polk County. September 1977. Polk County Historama. A brief history of Polk County.
- Koeing, J.W. 1961. The stratigraphic succession in Missouri. Missouri Geological Survey and Water Resources. 185 pp.
- Krusekopf, H.H. 1926. Soil survey of Polk County, Missouri. U.S. Department of Agriculture, Bureau of Chemicals and Soils.
- Marbut, C.F. 1910. Soil reconnaissance of the Ozarks region of Missouri and Arkansas. Field operations of the Bureau of Soils. U.S. Department of Agriculture.
- Missouri Crop and Livestock Reporting Service. 1990. Dade County agriculture-facts.
- Missouri Department of Agriculture. 1991. Missouri farm facts.

Missouri Department of Conservation. 1990. Study No. 68: Archer's index of upland furbearer populations. Job No. 1: Archer's index of upland furbearer populations, 1989. Federal Aid Project No. W-13-R-44.

Missouri Department of Conservation. 1990. Study No. 10: Furbearer harvest evaluation. Job No. W-13-R-44.

Missouri Geological Survey and Water Resources Division. 1961. The stratigraphic succession in Missouri. 185 pp., illus.

Ostrom, Arnold J. 1991. Timber resource of Missouri's prairie. Forest Service, North Central Forest Experiment Station. Resource Bulletin NC-117.

Robinette, G.O. 1972. Plants/people/environmental quality. U.S. Department of Interior, National Park Service.

Scholten, H. 1988. Farmstead shelterbelts-protection against wind and snow. University of Minnesota, CD-BU-0468.

Schroeder, Walter A. 1982. Presettlement prairie of Missouri. Natural History Series, No. 2. Missouri Department of Conservation.

Sweet, A.T., and Howard V. Jordon. 1928. Soil Survey of Lawrence County, Missouri. U.S. Department of Agriculture.

Thom, Richard H., and James H. Wilson. 1980. The natural divisions of Missouri. Transactions of the Missouri Academy of Sciences. Volume 14: 9-23.

United States Department of Agriculture. 1993. Soil survey manual. Soil Conservation Service, Soil Survey Staff, U.S. Department of Agriculture Handbook 18.

United States Department of Agriculture. 1998. Keys to soil taxonomy. 8th edition. Natural Resources Conservation Service, Soil Survey Staff.

United States Department of Agriculture. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, Soil Survey Staff, U.S. Department of Agriculture Handbook 436.

Watson, E.B. and H.F. Williams. 1909. Soil survey of Cedar County, Missouri. U.S. Department of Agriculture. 163 pp.

Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Argillite. Weakly metamorphosed mudstone or shale.

Aspect. The direction in which a slope faces.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Backslope. The geomorphic component that forms the steepest inclined surface and principal element of many hillsides. Backslopes in profile are commonly steep, are linear, and may or may not include cliff segments.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where

the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bedrock-floored plain. An extensive nearly level to gently rolling or moderately sloping area that is underlain by hard bedrock and has a slope of 0 to 8 percent.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Board foot. A unit of measure of the wood in lumber, logs, or trees. The amount of wood in a board 1 foot wide, 1 foot long, and 1 inch thick before finishing.

Bottomland. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks. The steep and very steep broken land at the border of an upland summit that is dissected by ravines.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Cable yarding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium

carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channeled. Refers to a drainage area in which natural meandering or repeated branching and convergence of a streambed have created deeply incised cuts, either active or abandoned, in alluvial material

Channery soil material. Soil material that is, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Clayey soil. Silty clay, sandy clay, or clay.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A

claypan is commonly hard when dry and plastic or stiff when wet.

Clearcut. A method of forest harvesting that removes the entire stand of trees in one cutting.

Reproduction is achieved artificially or by natural seeding from the adjacent stands.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Closed depression. A low area completely surrounded by higher ground and having no natural outlet.

Coarse fragments. Mineral or rock particles larger than 2 millimeters in diameter.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

Codominant trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above but comparatively little from the sides.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Commercial forest. Forest land capable of producing 20 cubic feet or more per acre per year at the culmination of mean annual increment.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese

oxide are generally considered a type of redoximorphic concentration.

Conglomerate. A coarse grained, clastic rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Consolidated sandstone. Sandstone that disperses within a few hours when fragments are placed in water. The fragments are extremely hard or very hard when dry, are not easily crushed, and cannot be textured by the usual field method.

Consolidated shale. Shale that disperses within a few hours when fragments are placed in water. The fragments are extremely hard or very hard when dry and are not easily crushed.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deep soil. A soil that is 40 to 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Dip slope. A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming. A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One

strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Dominant trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above and from the sides.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained*, *somewhat excessively drained*, *well drained*, *moderately well drained*, *somewhat poorly drained*, *poorly drained*, and *very poorly drained*. These classes are defined in the "Soil Survey Manual."

Drainage, surface. Runoff, or surface flow of water, from an area.

Drainageway. An area of ground at a lower elevation than the surrounding ground and in which water collects and is drained to a closed depression or lake or to a drainageway at a lower elevation. A drainageway may or may not have distinctly incised channels at its upper reaches or throughout its course.

Draw. A small stream valley that generally is more open and has broader bottom land than a ravine or gulch.

Duff. A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Dune. A mound, ridge, or hill of loose, windblown granular material (generally sand), either bare or covered with vegetation.

Effective cation-exchange capacity. The sum of ammonium acetate extractable bases plus potassium chloride extractable aluminum used for soils that have pH value less than 5.5.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Even aged. Refers to a stand of trees in which only small differences in age occur between individual trees. A range of 20 years is allowed.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Excess lime (in tables). Excess carbonates in the soil that restrict the growth of some plants.

Excess sodium (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

Excess sulfur (in tables). Excessive amount of sulfur in the soil. The sulfur causes extreme acidity if the soil is drained, and the growth of most plants is restricted.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the oven-dry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity*, *normal moisture capacity*, or *capillary capacity*.

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. Area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that is, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Flood plain step. An essentially flat, alluvial surface within a valley that is frequently covered by flood water from the present stream; any approximately horizontal surface frequently modified by scour and/or deposition. May occur individually or as a series of steps.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Footslope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Gypsum. A mineral consisting of hydrous calcium sulfate.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey

and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head out. To form a flower head.

Heavy metal. Inorganic substances that are solid at ordinary temperatures and are not soluble in water. They form oxides and hydroxides that are basic. Examples are copper, iron, cadmium, zinc, manganese, lead, and arsenic.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding

indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydraulic conductivity (K). The current standard for measuring a soil's ability to transmit water. Hydraulic conductivity is a numerical variable in an equation that can be either measured or estimated. It is one of the terms in Darcy's law: $Q=KAi$ —where "Q" is outflow (volume), "K" is the hydraulic conductivity of the material, "A" is the area through which the fluid moves per unit time, and "i" is the pressure gradient.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the

soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding. Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Knoll. A small, low, rounded hill rising above adjacent landforms.

Ksat. See Saturated hydraulic conductivity.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loamy soil. Coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, or silty clay loam.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Mean annual increment (MAI). The average annual increase in volume of a tree during the entire life of the tree.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Merchantable trees. Trees that are of sufficient size to be economically processed into wood products.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition,

or structure by heat, pressure, and movement.

Nearly all such rocks are crystalline.

Micro-high. An area that is 2 to 12 inches higher than the adjacent micro-low.

Micro-low. An area that is 2 to 12 inches lower than the adjacent micro-high.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately deep soil. A soil that is 20 to 40 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Observed rooting depth. Depth to which roots have been observed to penetrate.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Overstory. The trees in a forest that form the upper crown cover.

Oxbow. The horseshoe-shaped channel of a former meander, remaining after the stream formed a cutoff across a narrow meander neck.

Paleoterrace. An erosional remnant of a terrace which retains the surface form and alluvial deposits of its origin but was not emplaced by, and commonly does not grade to a present-day stream or drainage network.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan*, *fragipan*, *claypan*, *plowpan*, and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment. A thin layer of alluvial material that mantles an erosion surface and has been transported to its present position from higher lying areas of the erosion surface.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow	0.0 to 0.01 inch
Very slow	0.01 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plateau. An extensive upland mass with relatively flat summit area that is considerably elevated (more than 100 meters) above adjacent lowlands and separated from them on one or more sides by escarpments.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid or very rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the

same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Quartzite, metamorphic. Rock consisting mainly of quartz that formed through recrystallization of quartz-rich sandstone or chert.

Quartzite, sedimentary. Very hard but unmetamorphosed andstone consisting chiefly of quartz grains.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Regeneration. The new growth of a natural plant community, developing from seed.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relict stream terrace. One of a series of platforms in or adjacent to a stream valley that formed prior to the current stream system.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Riser. The relatively short, steeply sloping area below a terrace tread that grades to a lower terrace tread or base level.

Riverwash. Unstable areas of sandy, silty, clayey, or gravelly sediments. These areas are flooded, washed, and reworked by rivers so frequently that they support little or no vegetation.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a

diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop. Exposures of bare bedrock other than lava flows and rock-lined pits.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called groundwater runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sandy soil. Sand or loamy sand.

Saturated hydraulic conductivity (Ksat). Refers to the amount of water that would move vertically through a unit time under unit hydraulic gradient. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields. Terms describing Ksat are as follows:

Ksat class	cm/hr	in/hr
Very low	.....<0.0036	..... <0.001417
Low	.....0.00360 to <0.036	0.001417 to <0.1417
Moderately low	.....0.0360 to <0.360	0.01417 to <0.1417
Moderately high	.....0.360 to <3.60	0.1417 to <1.417
High	.....3.60 to <36.0	1.417 to <14.17
Very high	.....>36.0	..... >14.17

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Sawlogs. Logs of suitable size and quality for the production of lumber.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Scribner's log rule. A method of estimating the number of board feet that can be cut from a log of a given diameter and length.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

Sedimentary plain. An extensive nearly level to gently rolling or moderately sloping area that is underlain by sedimentary bedrock and that has a slope of 0 to 8 percent.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Sedimentary uplands. Land areas of bedrock formed from water- or wind-deposited sediments. They are higher on the landscape than the flood plain.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Semiconsolidated sedimentary beds. Soft geologic sediments that disperse when fragments are placed in water. The fragments are hard or very hard when dry. Determining the texture by the usual field method is difficult.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Shallow soil. A soil that is 10 to 20 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shelterwood system. A forest management system requiring the removal of a stand in a series of cuts so that regeneration occurs under a partial canopy. After regeneration, a final cut removes the shelterwood and allows the stand to develop in the open as an even-aged stand. The system is well suited to sites where shelter is needed for regeneration, and it can aid regeneration of the more intolerant tree species in a stand.

Shoulder slope. The uppermost inclined surface at the top of a hillside. It is the transition zone from the backslope to the summit of a hill or mountain. The surface is dominantly convex in profile and erosional in origin.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling

can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site class. A grouping of site indexes into five to seven production capability levels. Each level can be represented by a site curve.

Site curve (50-year). A set of related curves on a graph that shows the average height of dominant or dominant and codominant trees for a range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant or dominant and codominant trees that are 50 years old or are 50 years old at breast height.

Site curve (100-year). A set of related curves on a graph that shows the average height of dominant or dominant and codominant trees for a range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant or dominant and codominant trees that are 100 years old or are 100 years old at breast height.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Skid trails. Pathways along which logs are dragged to a common site for loading onto a logging truck.

Slash. The branches, treetops, reject logs, and broken or uprooted trees left on the ground after logging.

Slickens. Accumulations of fine textured material, such as material separated in placer-mine and ore-mill operations. Slickens from ore mills commonly consist of freshly ground rock that has undergone chemical treatment during the milling process.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, classes for simple slopes are as follows:

Level	0 to 1 percent
Nearly level	0 to 2 percent
Very gently sloping	1 to 3 percent
Gently sloping	2 to 5 percent
Moderately sloping	3 to 8 percent
Strongly sloping	8 to 15 percent
Moderately steep	15 to 20 percent
Steep	20 to 35 percent
Very steep	>35 percent and higher

Classes for complex slopes are as follows:

Level	0 to 1 percent
Nearly level	0 to 2 percent
Gently undulating	1 to 3 percent
Undulating	2 to 5 percent
Gently rolling	3 to 8 percent
Rolling	8 to 15 percent
Hilly	15 to 20 percent
Steep	20 to 35 percent
Very steep	35 percent and higher

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soft bedrock. Bedrock that can be excavated with

trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Species. A single, distinct kind of plant or animal having certain distinguishing characteristics.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Strath terrace. A surface cut formed by the erosion of hard or semiconsolidated bedrock and thinly mantled with stream deposits.

Stream channel. The hollow bed where a natural stream of surface water flows or may flow; the deepest or central part of the bed, formed by the main current and covered more or less continuously by water.

Stream terrace. One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel. It originally formed near the level of the stream and is the dissected remnants

of an abandoned flood plain, streambed, or valley floor that were produced during a former stage of erosion or deposition.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon.

Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit. A general term for the top, or highest level, of an upland feature, such as a hill or mountain. It commonly refers to a higher area that has a gentle slope and is flanked by steeper slopes.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Tailwater. The water directly downstream of a structure.

Talus. Fragments of rock and other soil material accumulated by gravity at the foot of cliffs or steep slopes.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The textural classes used in this survey are C—clay, CL—clay loam, FSL—fine sandy loam, L—loam, LS—loamy sand, S—sand, SCL—sandy clay loam, SIC—silty clay, SICL—silty clay loam, SIL—silt loam, SL—sandy loam, and VFSL—very fine sandy loam. Terms used in lieu of texture are WB—weathered bedrock and UWB—unweathered bedrock. The texture modifiers that may apply to textural classes are CBV—very cobbly, CBX—extremely cobbly, CN—channery, CNV—very channery, CNX—extremely channery, FLV—very flaggy, GR—gravelly, GRV—very gravelly, GRX—extremely gravelly, and STV—very stony.

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The outermost inclined surface at the base of a hill; part of a footslope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Trafficability. The degree to which a soil is capable of supporting vehicular traffic across a wide range in soil moisture conditions.

Tread. The relatively flat surface that was cut or built by stream or wave action.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley. An elongated depressional area primarily developed by stream action.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Very deep soil. A soil that is more than 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Very shallow soil. A soil that is less than 10 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

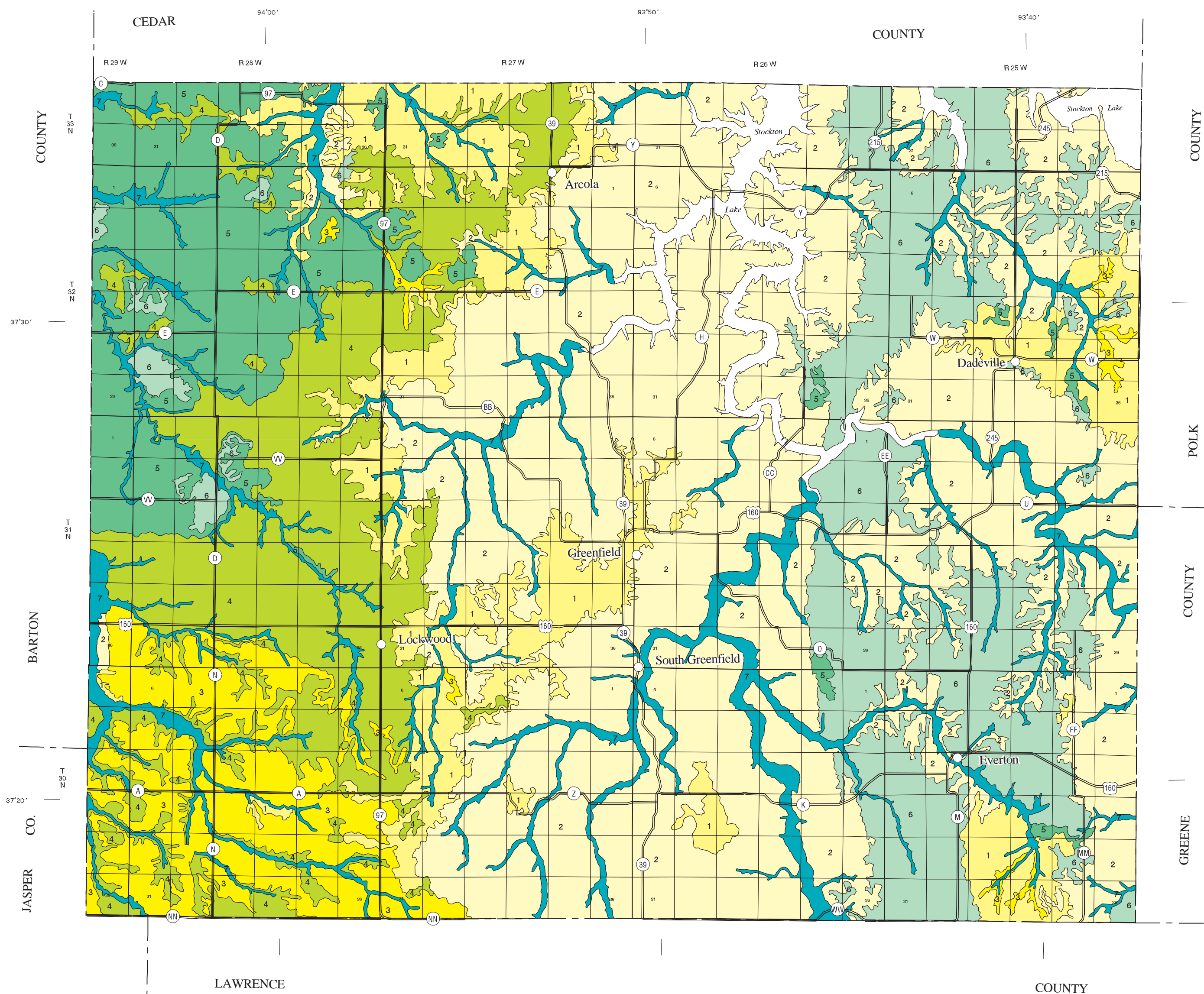
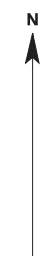
Water-spreading. Diverting runoff from natural channels by means of a system of dams, dikes, or ditches and spreading it over relatively flat surfaces.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

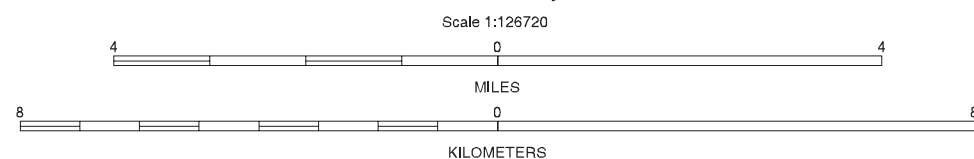
Wilting point (or permanent wilting point). The moisture content of soil, on an oven-dry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The uprooting and tipping over of trees by the wind.



UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
In Cooperation with
MISSOURI DEPARTMENT OF NATURAL RESOURCES,
MISSOURI AGRICULTURAL EXPERIMENT STATION
U.S. FOREST SERVICE

GENERAL SOIL MAP DADE COUNTY, MISSOURI



SOIL LEGEND*

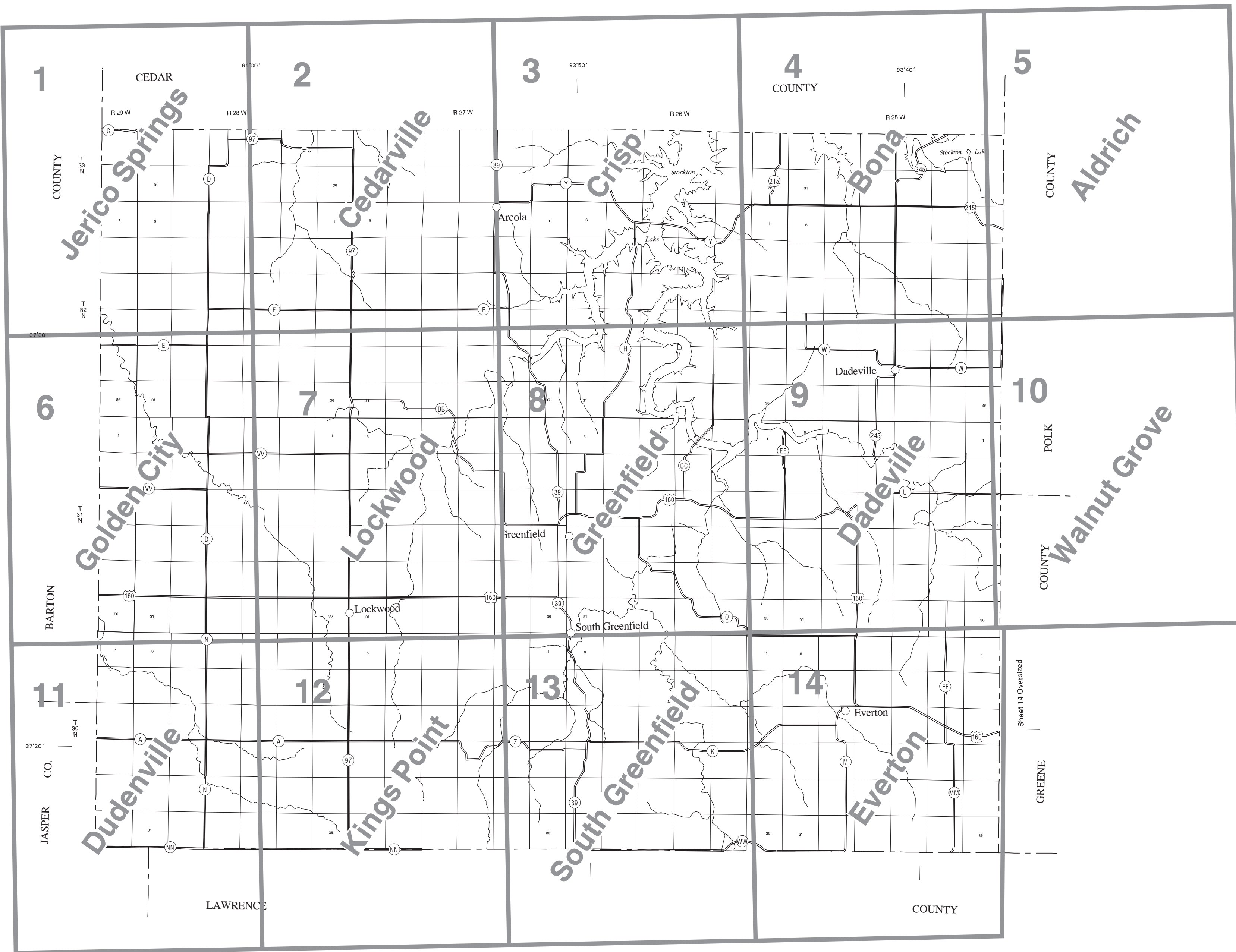
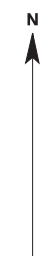
- 1 Bona-Creldon-Hoberg Association
- 2 Goss-Sonsac-Pomme Association
- 3 Creldon-Hoberg-Barden Association
- 4 Barden-Parsons Association
- 5 Sylvania-Barden-Barco Association
- 6 Clquot-Bolivar Association
- 7 Dameron-Sturkie Association

*The units on this legend are described in the text under the heading "General Soil Map Units."

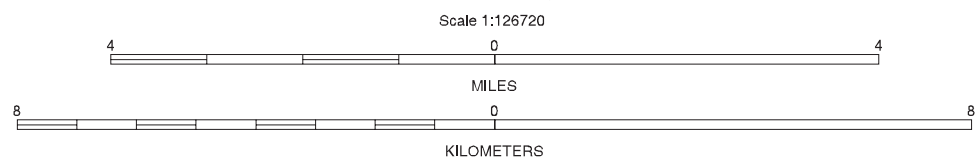
Compiled 1989

SECTIONALIZED TOWNSHIP					
6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Each area outlined on this map consists of more than one kind of soil. The map is meant for general planning rather than a basis for decisions on the use of specific tracts.



**INDEX TO MAP SHEETS
DADE COUNTY, MISSOURI**



SECTIONALIZED TOWNSHIP						
6	5	4	3	2	1	
7	8	9	10	11	12	
18	17	16	15	14	13	
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30	29	28	27	26	25	
31	32	33	34	35	36	



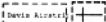




SOIL LEGEND

Approved map symbols consist of a five digit number. This number relates to the MLRA in which the official series typifying pedon resides and to the landform on which it occurs.

SYMBOL	NAME
15003	Basehor-Rock outcrop complex, 3 to 15 percent slopes
15004	Basehor fine sandy loam, 8 to 35 percent slopes, very stony, rocky
40000	Barden silt loam, 1 to 3 percent slopes
40003	Woodson silt loam, 1 to 3 percent slopes
40004	Barden loam, 2 to 5 percent slopes
40005	Sylvania loam, 5 to 15 percent slopes, very stony
40006	Barco-Sylvania complex, 2 to 5 percent slopes
40007	Eldorado gravelly loam, 3 to 15 percent slopes, very stony
40008	Parsons silt loam, 0 to 2 percent slopes
44000	Cherokee silt loam, 0 to 2 percent slopes
46001	Verdigris silt loam, 0 to 2 percent slopes, frequently flooded
46002	Hepler silt loam, 0 to 2 percent slopes, occasionally flooded
66001	Dameron silt loam, 0 to 3 percent slopes, frequently flooded
70000	Bona gravelly silt loam, 3 to 8 percent slopes
70006	Creldon silt loam, 1 to 3 percent slopes
70007	Cliquot gravelly loam, 8 to 15 percent slopes
70008	Goss gravelly silt loam, 3 to 8 percent slopes
70009	Goss gravelly silt loam, 8 to 15 percent slopes
70010	Goss very cobbly silt loam, 15 to 35 percent slopes
70012	Hoberg silt loam, 2 to 5 percent slopes
70014	Moko-Rock outcrop complex, 15 to 35 percent slopes, very stony
70040	Cliquot-Bolivar complex, 3 to 8 percent slopes
70041	Goss very gravelly silt loam, 8 to 15 percent slopes
70042	Goss very gravelly silt loam, 15 to 35 percent slopes
70043	Sonsac-Moko-Rock outcrop complex, 3 to 15 percent slopes
70044	Sonsac-Moko complex, 15 to 35 percent slopes, rocky
70045	Keeno gravelly silt loam, 3 to 8 percent slopes
70047	Wanda silt loam, 2 to 5 percent slopes
70048	Alsup silt loam, 8 to 15 percent slopes, very stony
73000	Pomme silt loam, 3 to 8 percent slopes
73008	Viraton silt loam, 2 to 5 percent slopes
73010	Wilderness gravelly silt loam, 3 to 8 percent slopes
73031	Gerald silt loam, 0 to 2 percent slopes
73059	Pomme silt loam, 1 to 3 percent slopes
73065	Wilderness very cobbly silt loam, 3 to 8 percent slopes, very stony
73075	Hobson loam, 1 to 3 percent slopes
74625	Hartville silt loam, 3 to 8 percent slopes
74641	Secesh silt loam, 0 to 2 percent slopes, occasionally flooded
75378	Sturkie silt loam, 0 to 2 percent slopes, frequently flooded
99000	Pits, quarries
99001	Water
99004	Kanima very channery silt loam, 8 to 50 percent slopes

CONVENTIONAL AND SPECIAL
SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES	
County or parish	
Field sheet matchline and neatline	
AD HOC BOUNDARY (label)	
LAND DIVISION CORNER (sections and land grants)	
ROAD EMBLEM & DESIGNATIONS	
Federal	
State	
DAMS	
Medium or Small (Named where applicable)	

WATER FEATURES

LAKES, PONDS AND RESERVOIRS	
Perennial	

SPECIAL SYMBOLS FOR
SOIL SURVEY

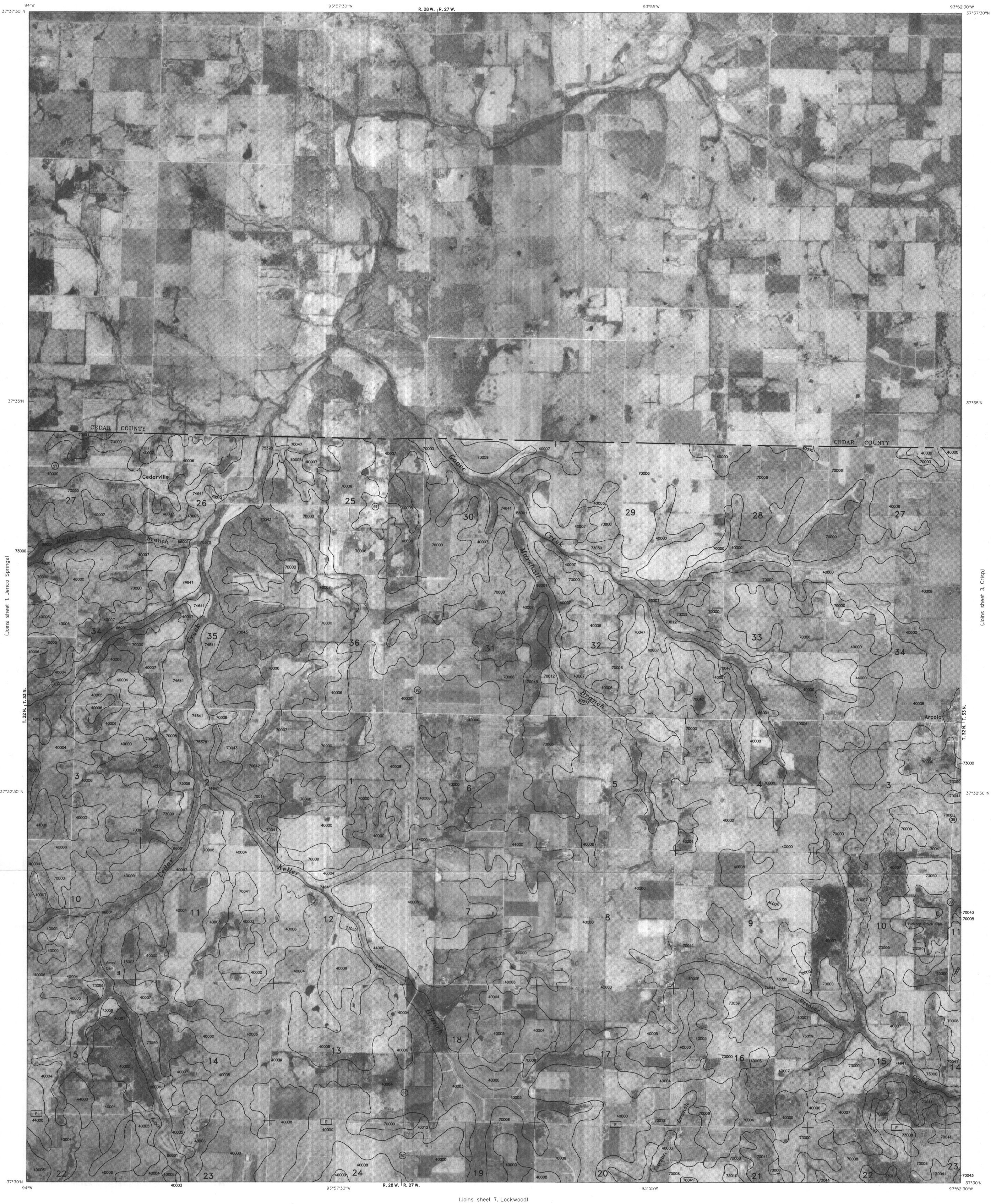
SOIL DELINEATIONS AND SYMBOLS	
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This soil survey map was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey, from aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned. Digital soils data is available for this quadrangle.

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Polyconic Projection
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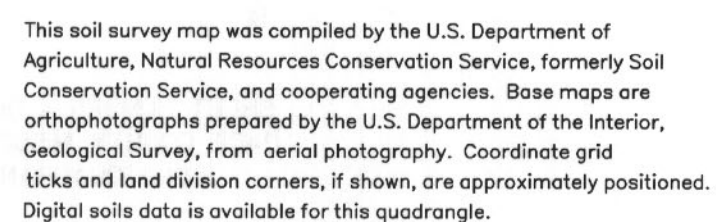
SHEET NUMBER 1 OF 14
DADE COUNTY, MISSOURI
JERICHO SPRINGS QUADRANGLE



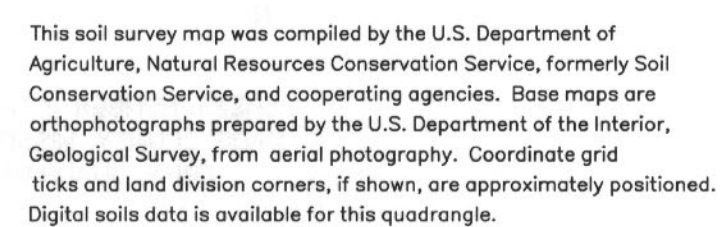
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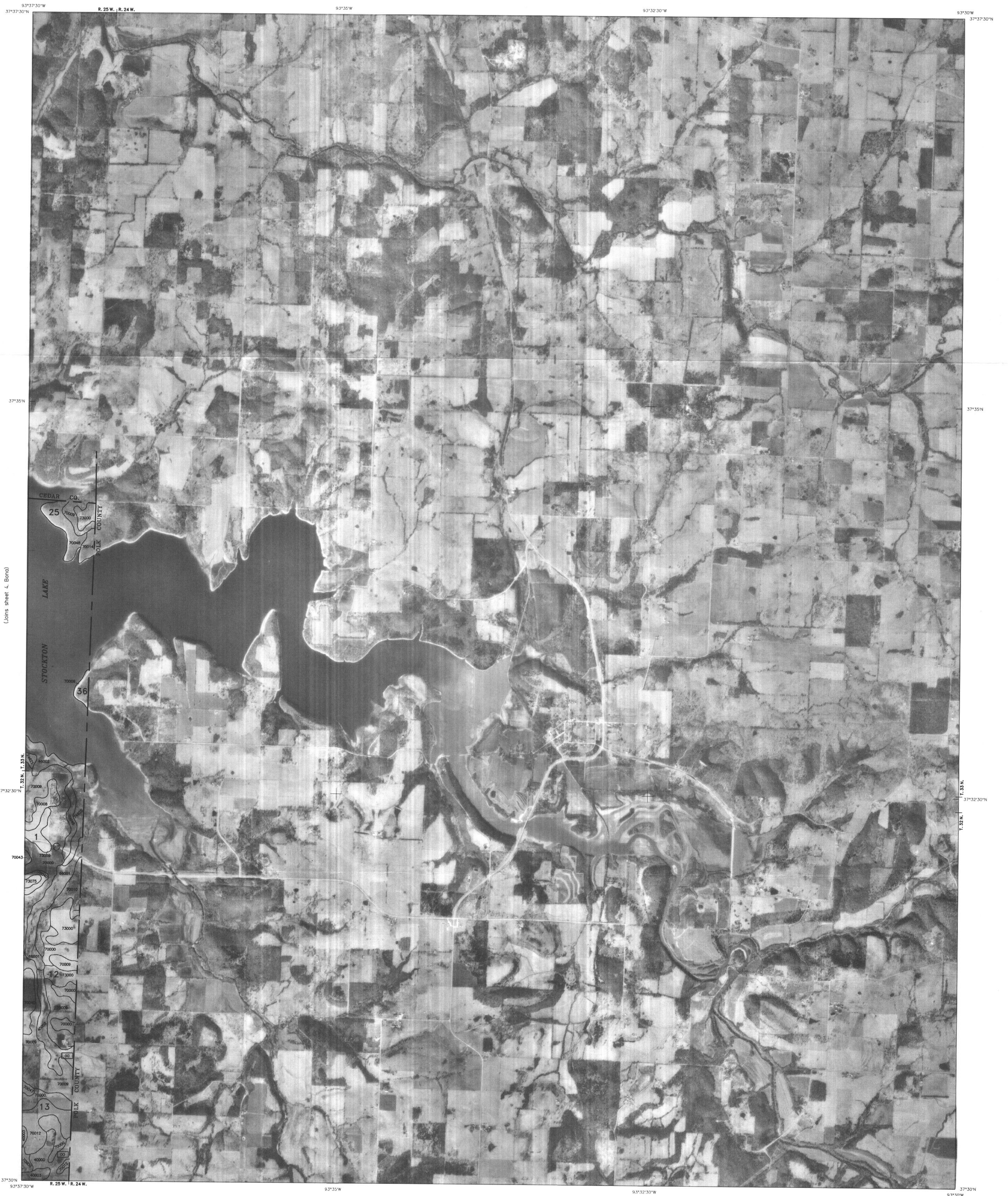
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DADE COUNTY, MISSOURI
CEDARVILLE QUADRANGLE



SHEET NUMBER 3 OF 14
DADE COUNTY, MISSOURI
CRISP QUADRANGLE



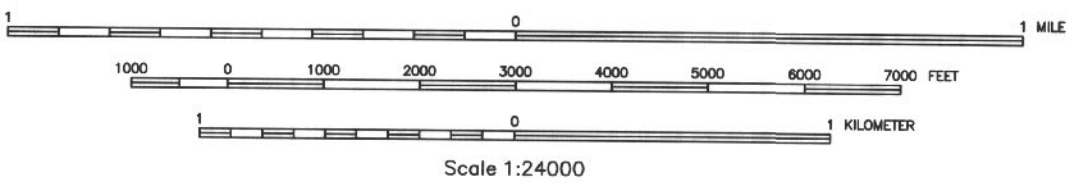
DADE COUNTY, MISSOURI NO. 4



(Joins sheet 4, Bona)

(Joins sheet 10, Walnut Grove)

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Polyconic Projection
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DADE COUNTY, MISSOURI NO. 5

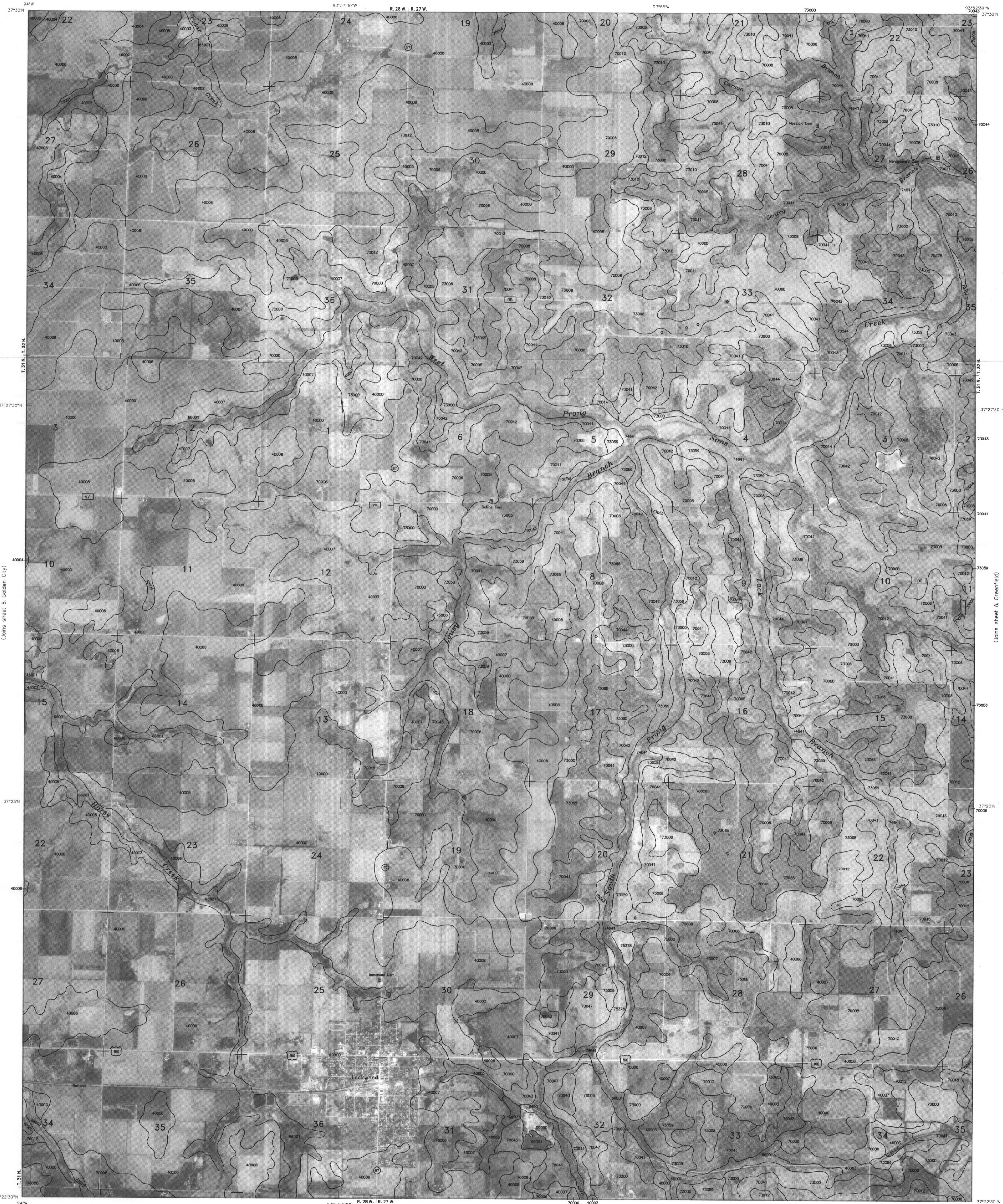


SHEET NUMBER 5 OF 14
DADE COUNTY, MISSOURI
ALDRICH QUADRANGLE

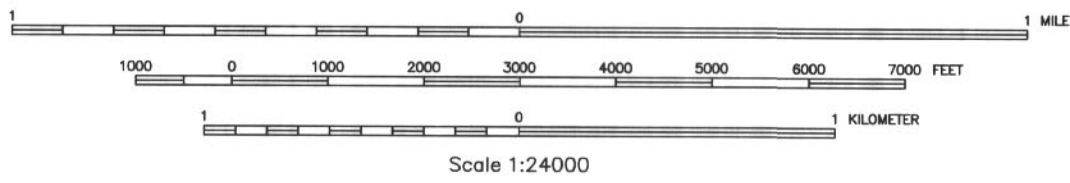


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(Joins sheet 2, Cedarville)



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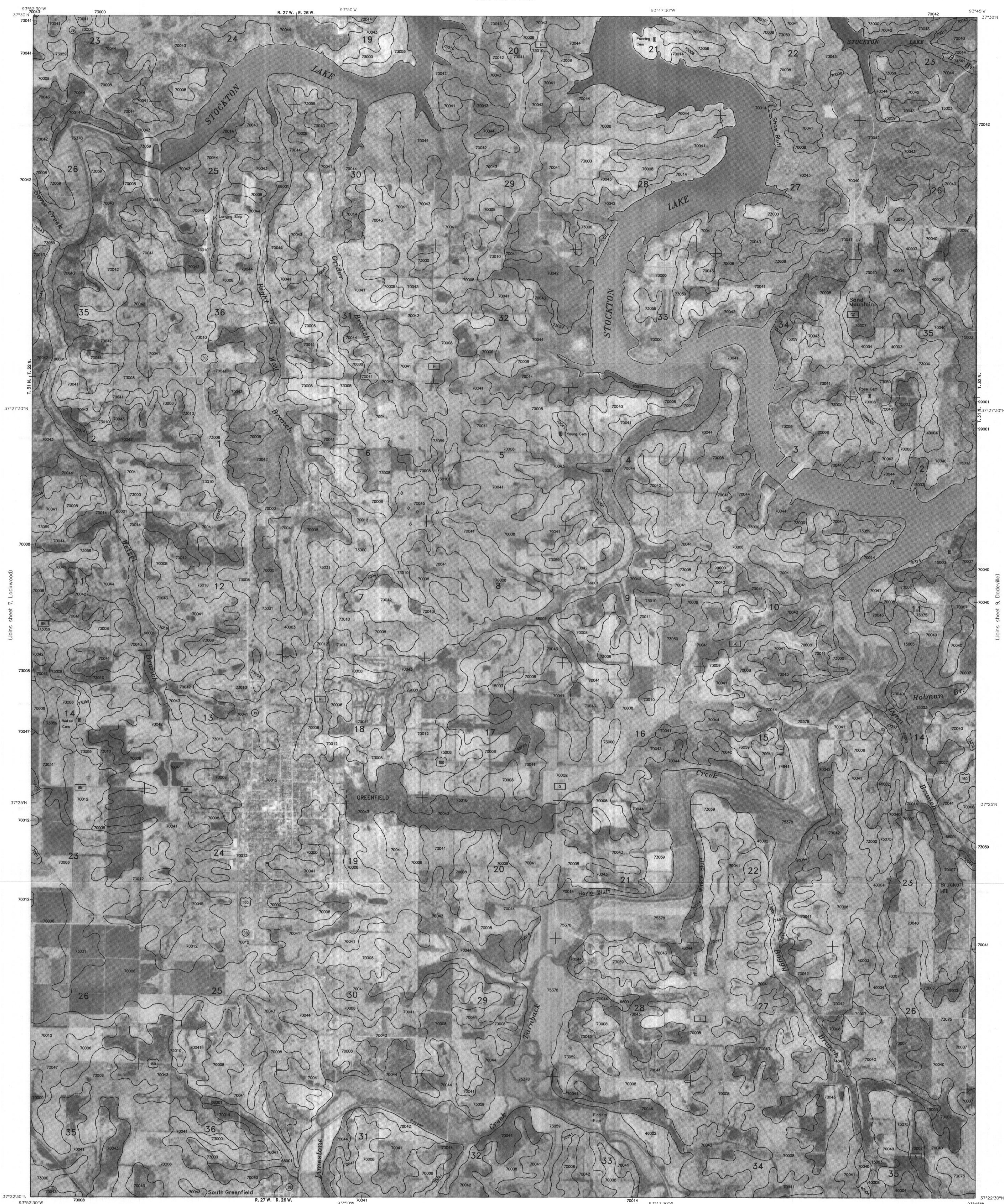
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DADE COUNTY, MISSOURI NO. 7

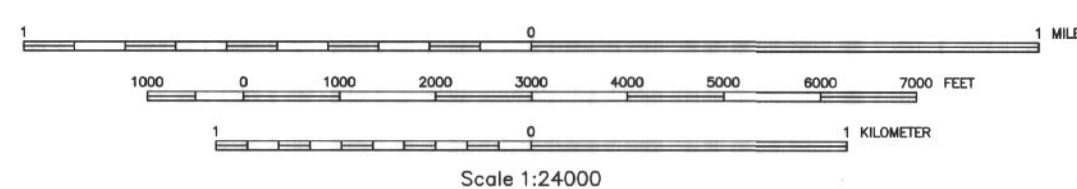


SHEET NUMBER 7 OF 14
DADE COUNTY, MISSOURI
LOCKWOOD QUADRANGLE

(Joins sheet 3. Crisp)



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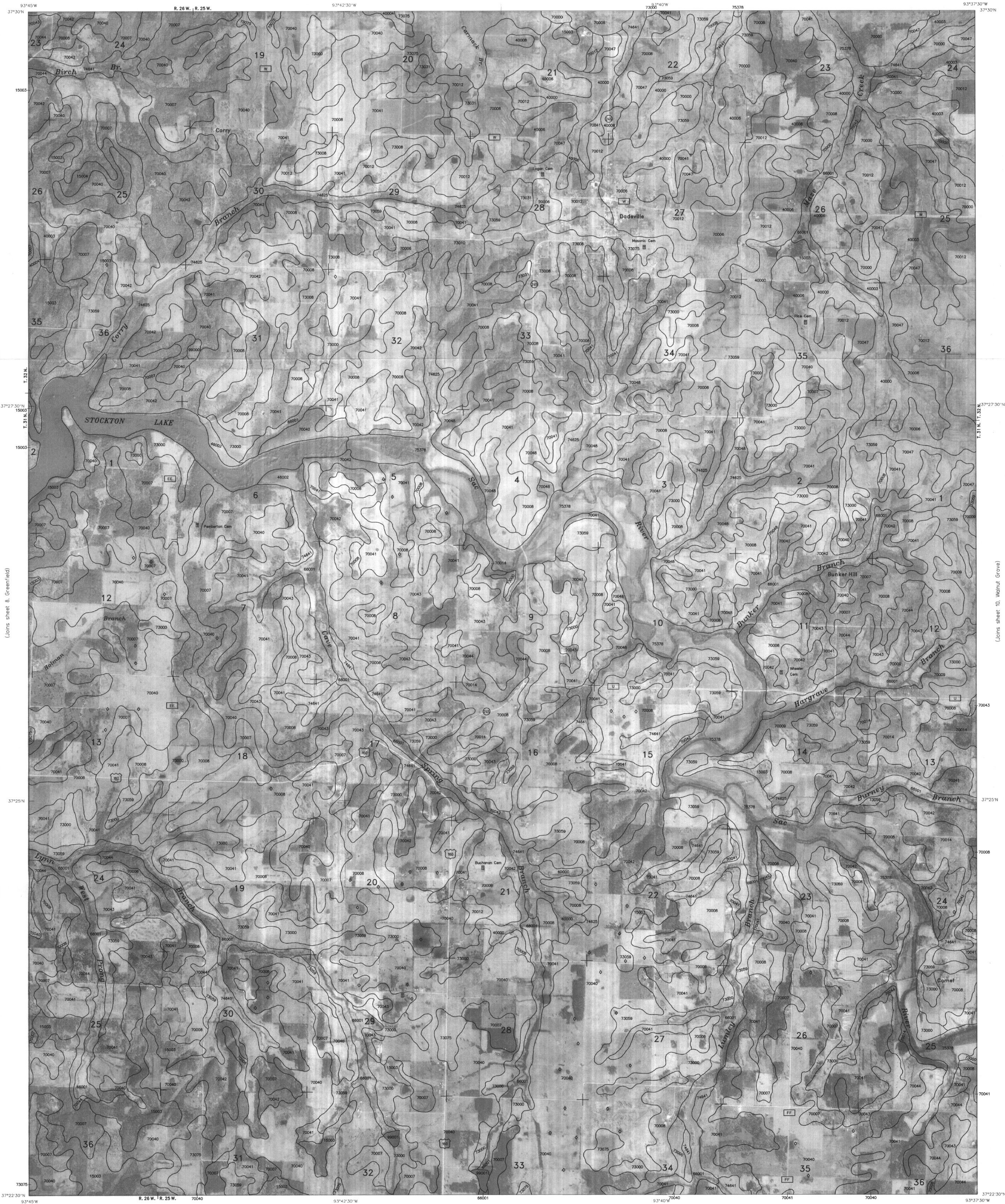


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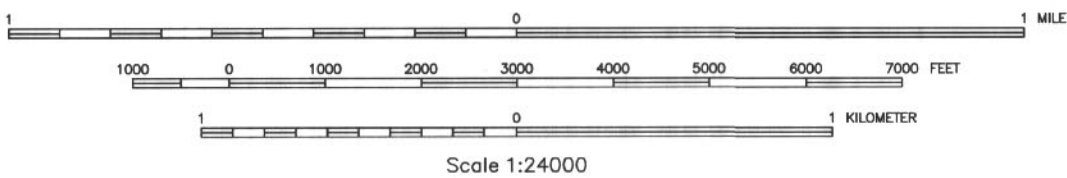
DADE COUNTY, MISSOURI NO. 8

SHEET NUMBER 8 OF 14
DADE COUNTY, MISSOURI
GREENFIELD QUADRANGLE

(Joins sheet 4, Bona)



(Joins sheet 14, Everton)



Digital Data: UTM Coordinate System Zone: 15
Polyconic Projection
1927 North American Datum

DADE COUNTY, MISSOURI NO. 9

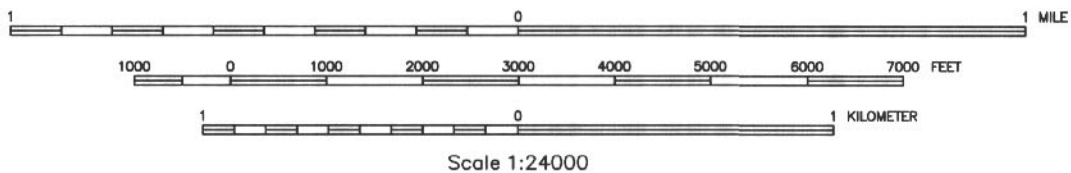
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SHEET NUMBER 9 OF 14
DADE COUNTY, MISSOURI
DADEVILLE QUADRANGLE

(Joins sheet 5, Aldrich)



(Joins sheet 14, Everton)



Digital Data: UTM Coordinate System Zone: 15
Polyconic Projection
1927 North American Datum

DADE COUNTY, MISSOURI NO. 10

N

SHEET NUMBER 10 OF 14
DADE COUNTY, MISSOURI
WALNUT GROVE QUADRANGLE

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DADE COUNTY, MISSOURI
DUDENVILLE QUADRANGLE
SHEET NUMBER 11
7.5 MINUTE SERIES

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 1 KILOMETER

Scale 1:24000

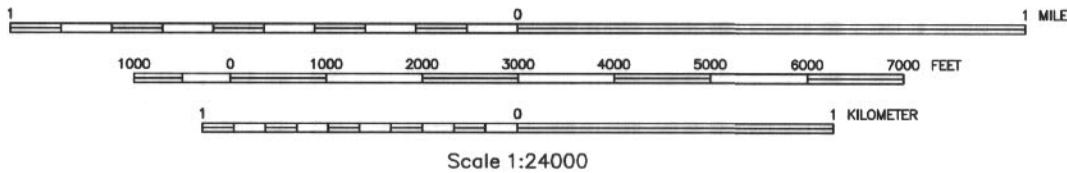
DADE COUNTY, MISSOURI NO. 11

SHEET NUMBER 11 OF 14
DADE COUNTY, MISSOURI
DUDENVILLE QUADRANGLE

(Joins sheet 7, Lockwood)



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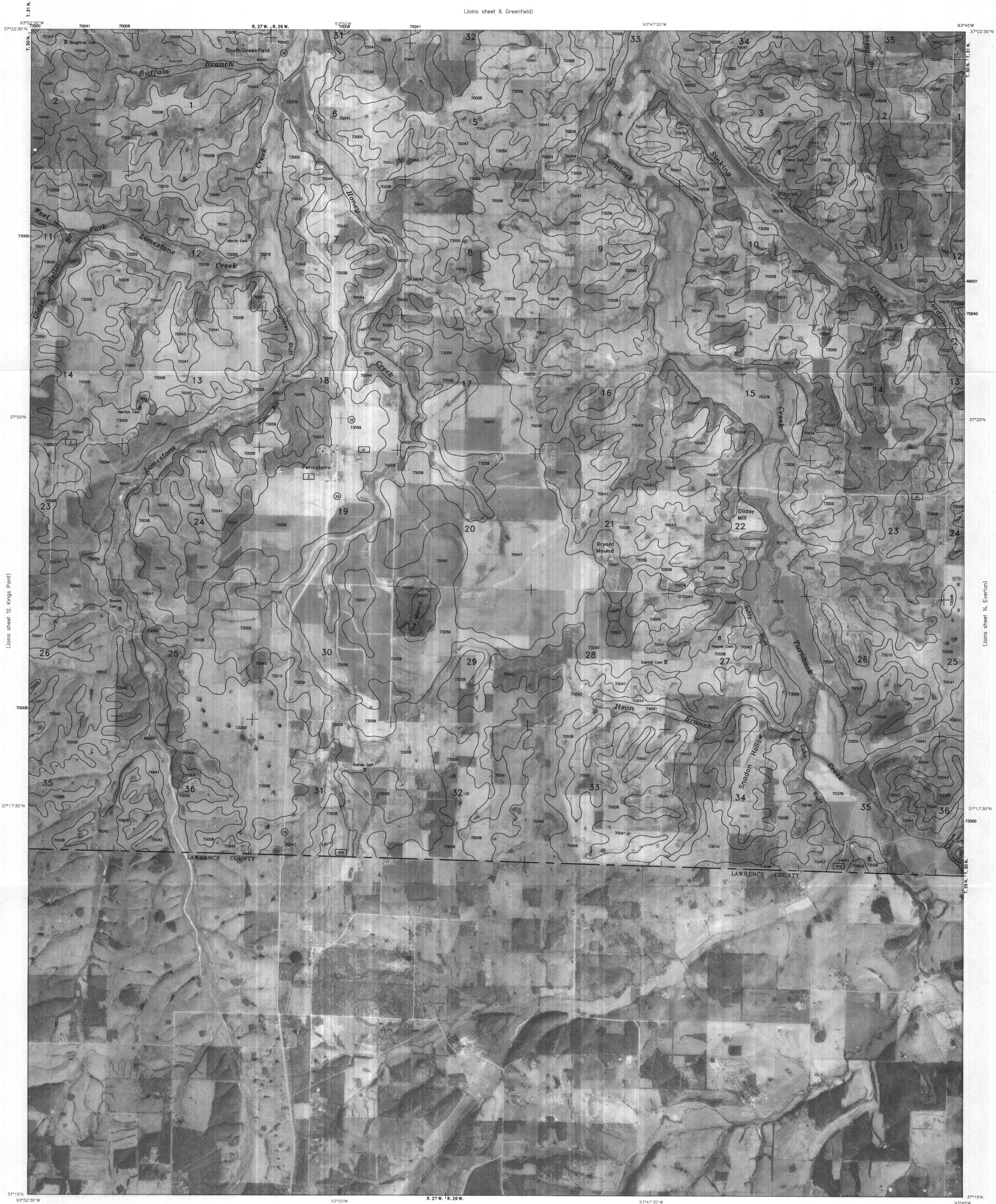


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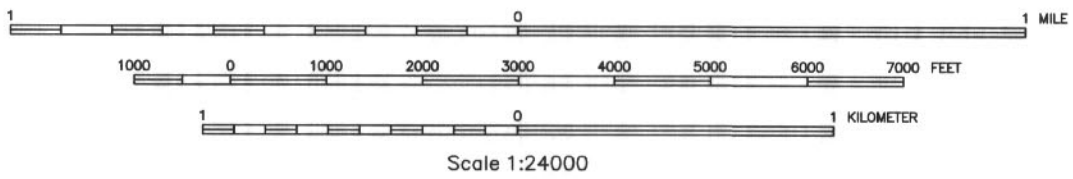
DADE COUNTY, MISSOURI NO. 12

SHEET NUMBER 12 OF 14
DADE COUNTY, MISSOURI
KINGS POINT QUADRANGLE

(Joins sheet 8, Greenfield)



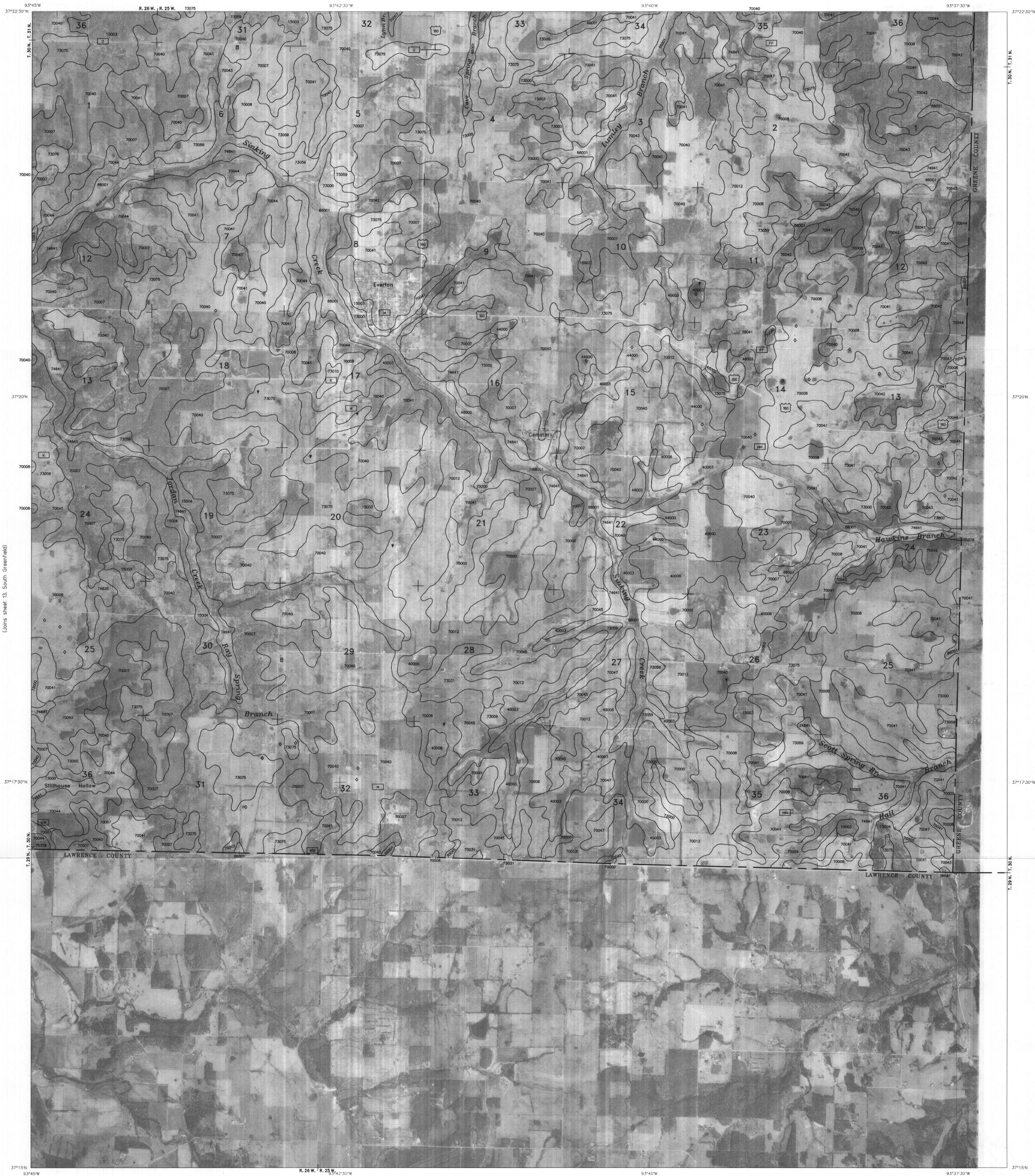
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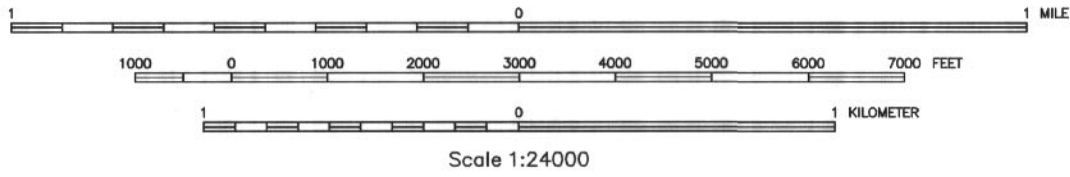
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DADE COUNTY, MISSOURI NO. 13

SHEET NUMBER 13 OF 14
DADE COUNTY, MISSOURI
SOUTH GREENFIELD QUADRANGLE

(Joins sheet 9, Dadeville)



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Digital Data: UTM Coordinate System Zone: 15
Polyconic Projection
1927 North American Datum
DADE COUNTY, MISSOURI NO. 14

SHEET NUMBER 14 OF 14
DADE COUNTY, MISSOURI
EVERTON QUADRANGLE